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About the Institute

The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

OUTLINE OF PROCEDURES
LEADING TO ADVANCED DEGREES IN THE
DEPARTMENT OF ENVIRONMENTAL,
POPULATION AND ORGANISMIC BIOLOGY

Dr. David Rogers
Hale 114

MAR 20 1975

1. GENERAL REGULATIONS

A. Admission

- A1. Each applicant should obtain a copy of the Graduate School Bulletin, supplied through the admissions office, 125 Regents Hall. Upon admission he/she is responsible for fulfillment of deadline and procedural requirements of that Bulletin and of this outline. Applicants must request, execute and return at once to the EPO Biology Department a pre-application form, on which basis the department advises the applicant whether to make formal application for admission. Approval of pre-application does not imply approval of application. Students for whom English is not the native language must be proficient in speaking, reading and writing English.
- A2. Application for admission to the Graduate School as a graduate biology student is made to the Department of EPO Biology. Those intending to work towards a Master of Arts as well as a Ph.D., should indicate both degrees on the application. Otherwise the intended one degree (M.A. I or II, or Ph.D.) is indicated (see Sections II and III for description of these degrees). The forms provided each applicant also cover scholarships, fellowships, and teaching and research assistantships. Two copies of official transcripts of all academic work must be filed with applications. All information should be returned to the Department of EPO Biology. Completed applications should be submitted to EPO Biology not later than February 1 for admission the following fall semester and October 1 for the following spring semester. Late applications will be considered but are less likely to be successful.
- A3. Applicants for University admission must take the General Aptitude Test (Verbal, Quantitative) and the Advanced Test in Biology of the Graduate Record Examinations. GRE Scores should be sent directly to the Department of EPO Biology from the Educational Testing Service at Box 1502, Berkeley, California 94701, or Box 955, Princeton, New Jersey 08540 prior to February 10. Applications without GRE scores will not be considered.
- A4. The Graduate Program Committee of the Department reviews these documents as soon as files are complete. Shortly before given deadlines, the committee recommends:
- A4a. acceptance of the applicant as a degree student (a student who may proceed towards a degree, and may select a graduate faculty member as a major advisor and chairman of the appropriate advisory committee)
- A4b. acceptance of the applicant as a provisional degree student (a student with several important deficiencies, a questionable academic record, or both, and hence on probation; such a

student may not immediately proceed towards a degree nor can he/she formally select a graduate faculty member as a major advisor)

A4c. rejection of the application.

Upon review of credentials, the Department and/or Graduate School will notify applicants of the decision. Only the Graduate School can issue a formal, valid admission and it also makes the final decision on status. The departmental recommendation is recorded on each application after it is reviewed. If an applicant is accepted as a degree or provisional degree student, he/she is sent a permit to register. The application and all pertinent correspondence are filed in the departmental office. If the student is not accepted, he/she is so notified and all documents are kept on file for one year. Transcripts indicating courses in progress pending receipt of degree must be replaced by official transcripts showing proof of degree awarded. All applicants are admitted subject to completion of anticipated degrees.

A5. Admission is completely independent of all forms of assistantship and fellowship awards.

B. Registration

B1. All students must appear at the University on the dates designated for counseling and registration as in the Graduate School Bulletin. At the departmental office, Ramaley 110, students will be referred to the appropriate advisors (see Section I-K for review of background, determination of deficiencies, if any, and formulation of a preliminary program. They then proceed with registration.

C. Admission Requirements

C1. Applicants lacking a Master's Degree

C1a. To qualify as a degree student an applicant lacking a Master's degree must have:

- (1) a baccalaureate degree
- (2) an undergraduate major, or equivalent thereof, in some biological area,
- (3) at least one year of college-level course work each in mathematics, physics, and chemistry;
- (4) a grade point average of 3.0 for both
 - (a) all undergraduate courses, and
 - (b) all courses in biological subjects.

C1b. Admission cannot be granted even on provisional status if the grade point average is less than 2.75 for either

- (1) undergraduate courses, or
- (2) biological courses collectively.

- C1c. Students lacking these minimal requirements have deficiencies that must be removed by credit courses taken during the first year (and preferably the first semester); deferral to the second year is permissible only insofar as removal the first year is prevented by schedule conflicts. Deficiencies that can be removed by courses at the 400 level of higher apply toward the M.A. degree, courses at the 500 level or higher apply toward the Ph.D. degree.

Even where no deficiencies exist, the Department may require certain courses, whether applicable to the degree sought or not, if the individual advisor or Advisory Committee so requests. Such requirements are designated solely in the interest of competence in the candidate's field.

Courses regarded as deficiencies can be considered removed

- (1) in non-biological undergraduate courses if a minimum grade of C is earned,
- (2) in biological and graduate courses only if a minimum of B is earned.

Any coursework that is "proficiencyed" is acceptable.

- C2. Admission requirements for students with a Master's degree are given in Section IIIA and IIIB of this Outline (p. 10).

D. Minimal Performance Criteria

- D1. All graduate students must maintain a grade point average no less than 3.0 at the end of each full scholastic year in order to register the following year. Reappointment eligibility of teaching assistants also requires satisfactory pedagogic performance and satisfactory academic progress. In addition, the Graduate School demands that, except for the Ph.D. degree, a 3.0 G.P.A. must be obtained either in all work offered for the degree, or in at least the minimum required hours. For the Ph.D., courses in which a grade less than B is obtained cannot be counted toward the degree, and a 3.0 G.P.A. is required in all work attempted in Graduate School. A student placed on probation by the Graduate School may be suspended subsequently; he/she should consult with his/her advisor at once upon receipt of such notice. The Advisory Committee is required at once upon notice of a possible suspension, to recommend a course of action to the Department Chairperson.

E. Time Limitations

- E1. The Department restricts degree and appointment eligibility for full-time Master's degree students to three years and for full-time Ph.D. students to four post-Master's years (or six years, if no Master's degree is held). Part-time or irregular applicants for the Master's degree must complete all degree requirements within five years or seven successive summers; those for the Ph.D. degree must

observe the Graduate School limitations. Minimum residence requirements are, for the Master's degree, two semester or its equivalent in summer terms (5-wk, summer session = 1/3 semester, 8-wk, summer session = 1/2 semesters); for the Ph.D. degree, six semesters or equivalent thereof are required. (See also Sect. III of this Outline).

F. Choice of Degree Candidacy

- F1. A student enrolling without a Master's degree may declare his intention to secure only a Master's degree, or to seek a Ph.D. degree. In the latter case, the student may elect to secure a Master's degree enroute to the Ph.D., or to bypass the Master's degree. Bypass nevertheless requires that he pass the Ph.D. preliminary examination with a "superior" rating and receive approval by a majority of his/her Ph.D. Preliminary Examining Committee. If a student was initially accepted for a Master's degree only, he/she must reapply to the Graduate School for admittance on a Ph.D. program.

G. Special Provisions in Relation to Graduate Teaching

- G1. All graduate students pursuing a Ph.D. degree in the Department of EPO Biology are required to complete at least one year of teaching experience in biological science at the secondary school level or above.
- G2. A teaching assistant employed on a half-time basis during a regular session shall not register for more than 9 nor fewer than 5 credit hours, regardless of the course numbers, except upon recommendation of the major advisor and approval of the Graduate Program Committee.

A teaching assistant employed on a half-time basis during summer sessions shall not register for more than 4 credit hours regardless of the course, numbers, except as above.

A teaching assistant working on a quarter-time basis shall not be limited in his/her registration beyond the limitation prescribed by the Graduate School for unemployed graduate students.

H. Independent Study Courses and Tutored Courses

- H1. No courses may be taken as Independent Study.
- H2. Registration for independent study or research courses requires submission in advance to the departmental office of an authorization signed by the person who will supervise the independent work. The area of study should not duplicate, overlap, or anticipate research undertaken for a thesis, nor should it in effect duplicate formal courses.

Independent Study or Independent Research may not be offered to satisfy any part of the minimum requirements for an optional minor at the graduate level. Independent study or research over 6 semester hours must be approved by the Advisory Committee. A graduate student must fill out an Independent Study Form in the

Biology office in addition to normal registration for any independent study or research course taken.

J. Transfer from Provisional to Degree Status

J1. All provisional degree students must apply through the Departmental Associate Chairperson to the Graduate School for change from provisional degree to degree status, preferably at the end of the first semester (with at least a minimal full-time load (see Sect. III, C1.) and no later than the end of the second semester. Approval by the Graduate School is virtually assured with 12 hours or more of B, but this usually requires a full year. Advisors and students are urged to request transfer after one semester if any convincing case can be made for it, e.g. grades above B level, success in difficult courses, strong faculty recommendations, etc. The advisor then recommends to the Associate Chairperson of the Department that

- (1) the student be informed he will not be allowed degree status in this Department, or,
- (2) that degree status be requested for him.

If a student is denied degree status after the full probationary period he/she shall be denied the privilege of taking further graduate work in the Department.

K. Orientation Advising

K1. All new graduate students will be assigned a temporary advisor by the Associate Chairperson. The student should consult with that advisor in writing or in person prior to the semester in which the student will enroll and determine what coursework he should or must take. The student and the advisor should determine at least two additional graduate committee members. This information should then be communicated to the EPO Biology Office on the Advisory Committee Form.

The temporary advisor, may become or be replaced by a permanent advisor as soon as the student's progress permits, during or as soon as possible after the first semester.

The record for each beginning student is reviewed by his/her advisor, in consultation with other committee members, to determine the most suitable course of studies. A schedule for completion of coursework, foreign languages, examinations, and thesis research should be reasonably well outlined by the end of the first year, and maintained as firmly as possible thereafter.

K2. Any student is at liberty to change advisors at any time, with approval of the Graduate Program Committee in consultation with the advisors concerned and without penalty of any sort.

L. Overall Progress

L1. The EPOB Graduate Program Committee is responsible for periodic review of all graduate students to determine eligibility for assignment of

teaching assistantships, scholarships, etc., and to assure that all are making satisfactory progress toward a degree.

M. Graduate Majors

- M1. The major is "Biology" for all degrees granted in the EPO Biology Department. Any courses taken in any department may, with the advisor's approval, be counted toward that major.

N. Departmental Colloquia

- N1. Regular attendance at departmental colloquia is expected of all graduate students.

II. THE MASTER'S DEGREE

A. Types of Master's Degrees

Only the degree Master of Arts is given by the Department.

Before the status of a graduate student has been established, he/she should, in consultation with his/her Advisor, decide on one of two plans leading to the Master's degree.

- A1. Plan I. Under this plan a student writes a thesis based on original research. At least 24 semester hours of work must be completed, including 6 for the thesis. A total of at least 12 semester hours, including thesis, must be at the 500 level or higher. The thesis hours may be taken during one or more semesters. A student must choose one of the following pathways.

A1a. M. A. | Degree Only

This pathway is chosen by students not intending to pursue a Ph.D. degree at this time.

A1b. M. A. | Degree - Ph.D. Degree

This pathway is chosen by students who anticipate pursuing a Ph.D. degree eventually at CU.

A2. Major Advisor and Advisory Committee

As soon as the permanent Advisor has been chosen, the student should secure from the departmental office a form entitled "Graduate Advisory Committee Appointment." This form is completed, in consultation with the prospective faculty advisor, in triplicate. One copy is submitted to the EPO Biology Office, one is retained by the student, and one by the advisor. The form in essence is

- (1) a request for permission to work under the person designated;
- (2) a signed compliance of the faculty member concerned;
- (3) a list of two other members of the three-man Advisory Committee, selected from the EPO Biology faculty; and,

in the case of Plan I students,

- (4) a brief statement of the area of research contemplated.

All three members of the advisory committee for Plan I Master's students must sign the completed thesis.

A3. Course Requirements

A3a. There are no specific course requirements for the Master's degree, except

- (1) the courses required for admission
- (2) two seminar courses involving student presentations, and
- (3) any additional general requirements of the student's Advisory Committee.

A3b. There is no foreign language requirement.

A4. Admission to Candidacy

A student ready to become a candidate for a Master's degree (i.e., to apply formally for the degree) must file application not later than 10 weeks prior to the Comprehensive Examination but not before all deficiencies are removed. Deficiencies may arise from admission requirements and/or advisory committee requirements. The number of hours to be presented for the degree must be determined before the application for candidacy may be filed. The application form is obtained from the departmental office.

A5. Transfer of Credit

Up to 8 semester hours of graduate credit may be transferred from recognized graduate schools if the credits have been earned five or fewer years before the Master's degree is awarded at this University, or are validated by special examination. Transfer or credit can only be made before the last semester begins and after a student has completed at least 6 hours and one term satisfactorily (at least a 3.0 G.P.A.) at this school and has consent of the departmental Associate Chairperson and the Dean of the Graduate School. The student wishing to transfer credits must present an official transcript to his major advisor and obtain his approval and that of the Departmental Associate Chairperson for the requested transfer of credits. After submission of the specific form required (obtainable from the Biology office), it is evaluated and approved or rejected by the Graduate School.

A6. The Comprehensive Examination for Plan I M.A. Degree

The candidate will be expected to demonstrate a depth of understanding beyond the normal coursework. The Advisory Committee will notify the student in advance of the basic plan and schedule for the examination. The Advisory Committee following the examination will meet and jointly consider the performance of each candidate on the examination.

A6a. M.A. I Degree Only

Those working only for an M.A. I will take a Comprehensive Examination given by their 3-man Advisory Committee. This examination will be based on material included in four of the subject areas designated in the list used for the Ph.D. Preliminary Examination (see Sec. 111G.). General Biology must be one of the four subject areas. The other three areas are to be chosen by the student in consultation with his/her Advisory Committee. The examination questions are to be prepared and approved by all members of the Advisory Committee prior to the date scheduled for the examination. The written exam will consist of two 3-hour sessions. An oral examination may be required by the Advisory Committee. The Advisory Committee will rate the performance as "satisfactory" or "unsatisfactory." If a student receives a rating of "unsatisfactory" he/she may repeat the examination only once. The repeat examination must be taken within six months of the date of the original examination. The student must take the Comprehensive Examination within two years of beginning graduate work.

A6b. M.A. I Degree - Ph.D. Degree Pathway

Those planning to go on to the Ph.D. will take the Ph.D. Preliminary Examination (see Sec. 111G.). A "satisfactory" or "superior" will satisfy the Comprehensive Examination requirements for the M.A. I. A student who has taken the M.A. I Comprehensive (Section A above) must take the Ph.D. Preliminary Examination if he/she later elects to pursue the Ph.D. Degree.

A7. Additional Requirements for M.A. I DegreeA7a. The Thesis

Before writing a thesis M.A. I students should obtain a copy of "Thesis Specifications" from the Biology office or the Graduate School office and follow directions meticulously. The thesis must be approved and signed by the three designated readers at least 30 days before the commencement at which the degree is to be conferred. Two formally approved copies of the thesis must be filed in the office of the Graduate School two weeks before the degree is conferred, and two copies with the Department (including one for the advisor).

A7b. Oral Defense of Thesis

The Advisory Committee conducts the oral defense of thesis. The examination must be held at least 30 days in advance of the thesis-submission deadline set by the Graduate School. The thesis must not be in final form at this time, so that changes and corrections suggested by the Advisory Committee may be incorporated.

A8. Publication of Thesis

A8a. (Same as III, K1.)

A8b. (Same as III, K2.)

A8c. (Same as III, K3.)

C. Typical Schedule of Deadlines for Master's Candidates

(See Catalog for precise dates in given years.)

Orientation advising	First registration in Graduate School
Advisory Committee appointed	As soon as possible or at least by the end of the first semester
Recommendation to Graduate School for removal of provisional status	After all deficiencies removed; after first semester but no later than second semester
Comprehensive Examination	As soon as possible, and no later than the fourth semester.
Degree Candidacy	After removing all deficiencies, and at least 10 weeks before reporting of the Comprehensive Examination to the Graduate School
Final Examination (defense of thesis, for Plan I students only)	About 6 weeks prior to end of session when degree is to be awarded
Approval of thesis for final typing	Following successful completion of oral defense of thesis.
Thesis filed in Graduate School	Two weeks prior to end of session when degree is to be awarded
Completion of all requirements for degree	Within three years for full-time students, 5 years or 7 successive summers for part-time students, after beginning of work for degree

III. THE PH.D. DEGREE

A. Admission Requirements

A1. Course Requirements

Applicants for study toward the Ph.D. degree are required to have the same coursework background as applicants for study toward the M.A. degree (see Sec. I, C). The Undergraduate gradepoint average is not an essential factor if the applicant holds a Master's degree. Any deficiency is to be removed as soon as possible after study toward the Ph.D. degree has begun.

A2. Students with an M.A. degree from C. U.

Any student obtaining a M.A. degree from C. U. may continue study toward a Ph.D. degree only if he/she has

A2a. approval of the M.A. Advisory Committee

A2b. demonstrated dedication to scholarly study, instruction and research

A2c. been accepted by an advisor for Ph.D. study,

and

A2d. received approval by the Graduate School of his/her new application (see page if applicable).

A3. Students with a non-C.U. Master's Degree

Students with a Master's degree from another institution must have

A3a. at least a 3.0 gradepoint average in both undergraduate and graduate courses in biology

A3b. favorable recommendations from faculty members familiar with his/her graduate study, including evidence of approval for continued graduate study

A3c. evident dedication to scholarly study, instruction and research

A3d. acceptance by a possible advisor or by the EPOB Department, based upon correspondence of interests and availability of facilities, and

A3e. acceptance by the Graduate School.

A4. Students without a Master's Degree

Students who do not have a Master's degree but who wish to bypass the Master's degree enroute to a Ph.D. degree must

A4a. fulfill the same entrance requirements as applicants for the M.A. degree

- A4b. be accepted by an advisor for Ph.D. study
- A4c. obtain a rating of superior on the Ph.D. Preliminary Examination (see
- A4d. receive approval by the Graduate Program Committee, and
- A4e. be accepted by the Graduate School

B. The Ph.D. Advisory Committee

- B1. The Ph.D. Advisory Committee shall be composed of 5 members of the Graduate Faculty and includes the advisor, at least two additional EPOB faculty, and at least one member who is not appointed fully or in part in E.P.O. Biology. The composition of this Advisory Committee must be approved by the Graduate Program Committee. Changes in the composition of the approved Advisory Committee must be approved by the Graduate Program Committee.

The function of the 5-man Advisory Committee is to guide the student's professional development and to provide advice concerning coursework and research. In addition, the Advisory Committee prepares and administers the Ph.D. Preliminary Examination, the Ph.D. Comprehensive Examination and the Final Examination.

When the thesis advisor is not a member of EPOB, a member of EPOB must serve as co-advisor for the student.

C. Residence Credit Requirement

- C1. A student must be registered to earn residence credit (see Graduate Catalog for definition). The minimum residence requirement is a total of 6 semesters beyond the Bachelor's degree. No more than 2 may be allowed for a Master's degree. At least 4 must be earned at this University, and at least 2 must be in one academic year. For residence credit only, full-time requires 5 hours at 500 or 600 level, or 8 hours of other graduate work or full-time thesis work. Full load for summer is 3 hours at 500 or 600 level, or 6 hours of other graduate work, or thesis.
- C2. Students employed 1/4 time or less earn full residence credit. Those employed more than 1/4 time but less than 3/4 time earn 3/4 residence credit.
- C3. After passing the Ph.D. Comprehensive, a student must maintain registration (at minimum fee, however, irrespective of enrollment hours) every semester (no summers required) until the degree is awarded or the student withdraws his/her candidacy.
- C4. For Selective Service and G.I. Bill purposes, full-time is regarded as 8 hours of coursework or full-time thesis work. Teaching assistants enrolled for 5 hours of coursework or thesis are considered full-time.

D. Degree Requirements

A student must satisfy the following requirements before the Ph.D. degree can be granted.

D1. Course Requirements

D1a. Course Credits

At least 46 semester hours of courses beyond the Bachelor's degree numbered 500 or above (including 16 thesis hours) are required. Twenty of the 30 non-thesis hours must be in graduate courses taken at C.U., and no more than 6 should be accepted in graduate Independent Study without consent of the student's Advisory Committee (see Sec. 1H). Students may use all 500, 600 and 700 level coursework taken at C.U. in fulfilling the minimum requirement for the Ph.D. degree. Courses taken outside of EPOB must be approved by the Advisory Committee.

D1b. Transfer Credits

The student may petition that a maximum of 10 semester hours of graduate coursework completed at another institution be transferred to C.U. and applied to the non-thesis semester-hour requirement. Petition forms may be obtained from the Graduate Secretary of EPOB.

D1c. Seminar Courses

At least 4 seminar courses involving student presentations must be completed satisfactorily. Enrollment in seminars should commence the first semester the student enrolls, and enrollment should be continuous until the requirement is fulfilled.

D1d. Other Courses

The advisor and/or Advisory Committee may impose any additional course requirements which they believe to be essential for the student's program of study.

D1e. Thesis Credits

Ph.D. degree students must register for a minimum of 16 and no more than 24 hours of thesis credit with no more than 8 hours taken in any one semester. Enrollment for thesis credit must be continuous until the degree is awarded. No more than 8 thesis hours may be taken before the Ph.D. Comprehensive Examination is passed (see below). A grade of IP is recorded for thesis credit each semester, and when the thesis has been completed, a final grade is determined by the Advisory Committee.

D2. Foreign Language Requirement

D2a. The Rules of the Graduate School currently specify that all Ph.D. candidates demonstrate proficiency in one foreign language.

D2b. This requirement may be satisfied by:

- (1) Completing a fourth semester undergraduate language course in an accredited academic program with a grade of no less than "C".

- (2) Passing the GSFLT Language Examination prepared by the Educational Testing Service of Princeton, New Jersey, in German, Russian, French, or Spanish with the following scores. (ETS information currently indicates that these scores are equivalent to a "C" grade in a fourth semester undergraduate course.) These scores are subject to change by the Graduate School at any time.

German	580
Russian	465
French	550
Spanish	550

- (3) Other demonstrations of similar proficiency include tests administered under the direction of chairmen of our foreign language departments, training in language institutes such as the armed service language institutes, training in federal programs such as the Peace Corps or Foreign Service, language training required for degrees obtained from foreign universities, and any other language training or experience that can be certified by chairmen of our language departments as equivalent to or exceeding a fourth semester undergraduate proficiency with a grade of no less than "C".

D3. Teaching Requirement

(see Sec. IG1)

D4. Ph.D. Preliminary Examination

D4a. The student must obtain a rating of superior on the Ph.D. Preliminary Examination (see Sec. IIIF).

D5. Ph.D. Comprehensive Examination

D5a. The student must obtain a rating of satisfactory on the Ph.D. Comprehensive Examination (see IIH).

D6. The Thesis

D6a. The Ph.D. Thesis must be based upon original investigation and must show mature scholarship and critical judgment as well as familiarity with tools and methods of research. It should be a contribution to knowledge in student's special field. The thesis project, plan and progress should be known to and approved by the Advisory Committee.

D7. Final Examination

D7a. The student must successfully defend the Ph.D. thesis and present a public seminar which summarizes his thesis research (see Sec. IIIJ).

E. Formal Admission to Candidacy for the Ph.D. degree

- E1. The student cannot apply for formal admission to candidacy for the Ph.D. degree until he/she has completed:
- (a) at least 4 semesters of full-time residence
 - (b) language, seminar and teaching requirements, and
 - (c) the Ph.D. Preliminary Examination with a rating of superior
- E2. The student must apply for candidacy no later than two weeks before the Ph.D. Comprehensive Examination is scheduled to be given. Blank forms for Admission to Candidacy can be obtained from the EPOB Office for formal departmental approval and submission to the Graduate School. Once the Comprehensive Examination is passed with a rating of satisfactory the student will be designated as a degree candidate. Once certified as a degree candidate, the student must maintain enrollment every regular semester (summer not included) until the Final Examination is passed. Registration after the Final Examination is passed is not required, although the Ph.D. degree will not be granted until the thesis is accepted by the Graduate School.

F. The Ph.D. Preliminary Examination

- F1. The Ph.D. Preliminary Examination is to be taken within one year by any student entering with a Master's degree, and within 3 semesters by those entering with a Bachelor's degree and planning to continue for the Ph.D. degree. This examination includes a written portion given in 4 half-day sessions followed within approximately 10 days by a half-day oral examination.
- F2. The Ph.D. Preliminary Examination is structured, scheduled and administered by the Advisory Committee in consultation with the student. The written portion is to be limited to General Biology and 3 additional areas from the Departmental listing (see Sec. III G) chosen by the student in consultation with the Advisory Committee. The student writes on one subject area for each half-day session of the written examination. The questions for the written examination are prepared and selected by the Advisory Committee, and no questions are to be given to the student in advance. However, the student is to be advised well in advance as to the nature of the examination (i.e., objective, subjective, combination). After the Advisory Committee members have read the student's answers on the written portion, they will administer the oral examination which may include material from the written examinations as well as other subject matter.
- F3. A rating of superior complies with the Ph.D. requirements. When appropriate, it also complies with M.A. I Comprehensive Examination requirements. A rating of satisfactory on the Ph.D. Preliminary Examination fulfills the requirement for the M.A. I Comprehensive Examination, but does not satisfy the Ph.D. requirement.

F4. An examination completed with a satisfactory or unsatisfactory rating may be repeated only once. The second attempt must be made within 3 to 6 months of the first attempt.

G. Subject Areas for the M.A. I Comprehensive and Ph.D. Preliminary Examination

- (1) General Biology (required of all students)
- (2) Biology of Special Taxa (choose one subarea)
 - A. "Animals" (invertebrates or vertebrates)
 - B. "Plants" (non-vascular or vascular)
 - C. "Microorganisms" (procaryotic or eucaryotic)
- (3) Anatomy, Morphology and Physiology (choose one subarea)
 - A. "Animal"
 - B. "Plants"
 - C. "Microorganisms"
- (4) Genetics and Evolution
- (5) Taxonomy and Systematics
- (6) Animal Behavior
- (7) Ecology (including limnology)

H. The Ph.D. Comprehensive Examination

- H1. The Comprehensive Examination covers areas related to the student's field of research and is intended to detect significant weaknesses and to prescribe remedial action where necessary.
- H2. The Ph.D. Comprehensive Examination consists of a half-day oral examination conducted by the student's Advisory Committee.
- H3. The student must submit a written copy of a thesis research proposal to each member of the Advisory Committee at least one week prior to the oral examination. Discussion of the research proposal is part of the examination. The thesis research proposal should include:
 - H3a. demonstration of knowledge of pertinent literature
 - H3b. rationale for proposed research
 - H3c. relevant preliminary research already completed or in progress (if any)
 - H3d. experimental design including proposed analysis of data

- H4. At least one week prior to the Ph.D. Comprehensive Examination, the student must notify the EPOB Office of his/her name, the date and time of the examination, and the names of the five committee members (including the advisor). A form for reporting this information is available in the EPOB Office. This information is relayed to the Graduate School which returns a reporting form to the Advisor. Following the examination this form is to be marked "satisfactory" or "unsatisfactory", signed by all members of the Advisory Committee, and returned to the EPOB Office for relay to the Graduate School.
- H5. If the oral examination reveals deficiencies, a rating of satisfactory may be designated as contingent upon completion of specified requirements.
- If a student receives a rating of unsatisfactory he/she may repeat the examination once. The second examination must be taken no sooner than 3 months and not more than six months later.
- H6. The student must register every semester (not including summer) after the Ph.D. Comprehensive Examination is passed and until the Final Examination is passed.
- H7. If a student does not complete all requirements for the Ph.D. degree within four years of the date on which the Ph.D. Comprehensive Examination was passed, he must take a second Ph.D. Comprehensive Examination. The second examination should be similar in content to the first and should be administered by the Advisory Committee. If the student receives a rating of unsatisfactory on this second examination he may retake it once, no sooner than three months and no more than six months later.

J. The Final Examination

- J1. The student must notify the Graduate School of the exact title of the thesis at least six weeks before he/she expects conferral of the Ph.D. degree. The title will appear in the Commencement Program. The student must obtain from the Graduate School directions for the Dissertation Abstracts manuscript, the Final Examination Notice or Leaflet, and University Microfilms agreement form several weeks before the date of the Final Examination. The Final Examination Leaflet is to be completed by the student and returned to the Graduate School at least two weeks before the examination. The other forms will be returned to the Graduate School with the final copy of the thesis. The student will pay the \$25.00 fee at that time.
- J2. The Final Examination will consist of two parts:
- J2a. Part I. The evaluation of a penultimate draft of the thesis. A copy of the penultimate draft of the thesis is to be approved by the advisor for submission to the Advisory Committee at least two weeks prior to a formal defense by the student.

The basic format for the thesis is to be determined by the advisor in consultation with the student, and must conform with Graduate School requirements. It is the responsibility of the student to be certain that Graduate School requirements for the format of the thesis are met.

Following a thorough examination of the thesis, the Advisory Committee may wish to read the revised draft or may empower the advisor to verify that any necessary alterations have been incorporated.

Preparation of the final draft, which incorporates all revisions, is to be completed prior to the public seminar.

J2b. Part 2. The Public Seminar

The second portion of the Final Examination is a formal 50-minute public seminar during which the student discusses the results of his/her thesis research. Following the seminar, the Advisory Committee will sign the final approved copies of the thesis. The student must present both the advisor and the EPOB Department with a copy of the thesis. Prior to signing the thesis, the Advisory Committee should ascertain that all remedial requirements have been fulfilled.

K. Publication of Thesis

- K1. Publication of thesis is not required but is strongly recommended. Publication of all or any part of the thesis prior to granting of the degree is permissible only by prior approval of the Advisory Committee. A letter to this effect from the Advisory Committee must be placed in the student's departmental file and a copy forwarded to the Graduate School.
- K2. If a substantial portion of the thesis has not been accepted for publication within three years of degree conferral, the advisor has the option of using the data for publication under joint authorship.
- K3. When publishing thesis material whole or in part, the author should indicate his/her address as the Department of Environmental, Population and Organismic Biology, University of Colorado, Boulder, Colorado, 80302. The author's current address (if different) should be noted for reprints. A reprint of all published materials from theses should be forwarded to the EPOB Office.

L. Typical Schedule of Deadlines of Ph.D. Candidates (See the Graduate Bulletin for precise dates in given years)

Advisory Committee appointed	As soon as possible, or by the end of the first semester
Preliminary Examination	Without M.A. degree, by 3rd full-time semester after enrollment; with a M.A. degree, by end of 2nd semester
Language Examination and Seminars	During first year and by usually uninterrupted registration thereafter until complete

Application for candidacy filed	By two weeks prior to Comprehensive Examination
Comprehensive Examination (Oral)	Prior to beginning in depth research on thesis topic
Penultimate draft of thesis available to Committee	At least 14 days prior to Final Examination
Final Examination (Defense of Thesis and Public Seminar)	At least 4 weeks prior to Commencement
Thesis filed in Graduate School	At least 2 weeks prior to Commencement
Completion of all degree requirements	Within 4 years after admission with an M.A. degree, 6 years if no M.A. degree sought

IV. EXCEPTIONS TO GRADUATE STUDENT REGULATIONS

A student, advisor, or Advisory Committee may petition the Graduate Program Committee concerning exceptions and/or alterations in the EPOB departmental requirements described above. After reviewing the petition (including interviews if necessary) the Graduate Program Committee will forward the petition along with its recommendation to the Executive Committee for final decision.

OUTLINE OF PROCEDURES
LEADING TO ADVANCED DEGREES IN THE
DEPARTMENT OF BIOLOGY

Rev. 1-72

1
GENERAL REGULATIONS

Rogers

Admission

Each applicant should obtain a copy of the Graduate Catalog, supplied through the admissions office, 125 Regents Hall. Upon admission he is responsible for fulfillment of deadline and procedural requirements of that Catalog and of this Outline. Foreign applicants must request, execute and return at once to the Biology Department a pre-application form, on which basis the department advises the applicant whether to make formal application for admission. Approval of pre-application does not imply approval of application. If application is permitted, the forms are actually sent through the Graduate and International Student Admissions Office, which forwards the completed application to the Biology office.

Otherwise, application for admission to the Graduate School as a graduate biology student is made to the Department of Biology. For those intending to work towards a Master of Arts as well as a Ph.D., please indicate both degrees on the application, otherwise the intended one degree (M.A. (I or II, or Ph.D.) is indicated. The forms provided each applicant also cover scholarships, fellowships, and teaching and research assistantships. Two copies of official transcripts of all academic work must be filed with applications. All information should be returned to the Department of Biology. Applications should be submitted not less than two months before opening day of the term for which admission is sought. Indication on the application of the preferred Division (Environmental, Organismic, Population Studies) of the Department is helpful.

Applications for University admission must be accompanied by scores for the General Aptitude Test (Verbal, Quantitative) and the Advanced Test in Biology of the Graduate Record Examinations. GRE Scores should be sent directly to the Department of Biology from the Educational Testing Service at Box 1502, Berkeley, California 94701, or Box 955, Princeton, New Jersey 08540.

The appropriate Divisional graduate program committee of the Department reviews these documents as soon as competitive files are complete. Shortly before given deadlines, the committee recommends to the Departmental Graduate Committee: 1) acceptance of the applicant as a degree student (a student who may proceed towards a degree, and may select a graduate faculty member as a major advisor and chairman of his degree committee); 2) acceptance of the applicant as a provisional degree student (a student with several important deficiencies, a questionable academic record, or both, and hence on probation; such a student may not immediately proceed towards a degree nor can he formally select a graduate faculty member as a major advisor); 3) rejection of the application.

Upon review of credentials, applicants are notified of the decision of the Department and/or Graduate School. Only the Graduate School can issue a formal, valid admission and it also makes the final decision on status. The departmental recommendation is recorded on each application after it is reviewed. If an applicant is accepted as a degree or provisional degree student, he is sent a permit to register. His application and all pertinent correspondence are filed in the departmental office. If the student is not accepted, he is so notified and all documents are kept on file for one year. Transcripts indicating courses "In Progress" pending receipt of degree must be replaced by official transcripts showing proof of degree awarded. All applicants are admitted subject to completion of anticipated degrees.

Admission is completely independent of all forms of appointments.

Registration

All students appear at the University on the dates designated for counseling and registration. At the departmental office, Ramaley 110, they are referred to the appropriate Division and thence to advisors (see "Orientation Advising") for review of background, determination of deficiencies, if any, and formulation of a preliminary program (this constitutes the "Qualifying Examination" of the Graduate Catalog). They then proceed with registration.

Admission Requirements

To qualify as a degree student an applicant lacking a Master's degree must have: 1) a baccalaureate degree; 2) an undergraduate major, or equivalent thereof, in some biological area, including at least 8 semester hours of General Biology (or a combination of General Zoology and General Botany), 3 semester hours of Genetics, and 19 additional semester hours; 3) appropriate ancillary coursework, in mathematics, physics, and chemistry; 4) a gradepoint average of 3.0 for both (a) all undergraduate courses and (b) all courses in biological subjects; 5) other specific requirements, if any, of the Division entered. Admission cannot be granted even on provisional status if the gradepoint average is less than 2.75 for either (a) undergraduate courses or (b) biological courses collectively.

Students lacking these minimal requirements have deficiencies that must be removed by credit courses taken during the first year (and preferably the first semester); deferral to the second year is permissible only insofar as removal the first year is prevented by schedule conflicts. Deficiencies that can be removed by courses at the 400 level or higher count toward the graduate degree, if eligible.

Even where no deficiencies exist, the Department may require certain courses, whether applicable to the degree sought or not, if the individual advisor or Advisory Committee so requests. Such requirements are designated solely in the interest of competence in the candidate's field.

Courses regarded as deficiencies can be considered removed (a) in non-biological undergraduate courses if a minimum grade of C is earned, (b) in biological and graduate courses only if a minimum of B is earned. Any coursework that is "proficiency" is acceptable. Admission requirements for students with a Master's degree are given in Section III of this Outline.

Minimal Performance Criteria

The Biology Department requires that all graduate students possess a cumulative gradepoint average in biological courses taken while a graduate student in CU of no less than 3.0 at the end of each full scholastic year in order to register the following year. Reappointment eligibility of assistants also requires satisfactory pedagogic performance and satisfactory academic progress. In addition, the Graduate School demands that, except for the Ph.D. degree, a 3.0 av. must be obtained either in all work offered for the degree, or in at least the minimum required hours. For the Ph.D., courses receiving less than a B cannot be counted toward the degree, and a 3.0 av. is required in all work attempted in Graduate School. A student placed on probation by the Graduate School may be suspended subsequently; he should consult with his Advisor at once upon receipt of such notice. Action of the Advisory Committee is required at once upon notice of a possible suspension, recommending a course of action to the Department Chairman.

Time Limitations

With rare exception, the Department restricts degree and appointment eligibility for full-time Master's degree students to two years and for full-time Ph.D. students to three post-Master's years (or four years, if no Master's degree is held). Part-time or irregular applicants for the Master's degree must complete all degree requirements within five years or seven successive summers; those for the Ph.D. degree must observe the Graduate School limitations. Minimum residence requirements are, for the Master's degree, two semesters or its equivalent in summer terms (5-wk. summer session = 1/3 semester, 8-wk. summer session = 1/2 semester); for the Ph.D. degree, six semesters or equivalent thereof are required. (See also Sect. III of this Outline.)

Choice of Degree Candidacy

A student enrolling without a Master's degree may declare his intention to secure a terminal Master's degree, or to seek a Ph.D. degree. In the latter case, the student may elect to secure a Master's degree enroute to the Ph.D., or to bypass the Master's degree. Bypass nevertheless requires that he pass the Comprehensive examination with a "superior" rating.

Special Provisions in Relation to Graduate Teaching

All graduate students pursuing a Ph.D. degree in the Department of EPO Biology are required to complete at least one year of responsible teaching experience.

A teaching assistant working on a quarter-time basis shall not be limited in his registration beyond the limitation prescribed by the Graduate School for unemployed graduate students.

A teaching assistant employed on a half-time basis during a regular session shall not register for more than 9 nor fewer than 5 credit hours, regardless of the course numbers of the credit hours presented, except upon recommendation of the major advisor and approval of the Divisional and Departmental Chairmen.

A teaching assistant employed on a half-time basis during summer sessions shall not register for more than 4 credit hours regardless of the course numbers of the credit hours presented, except as above.

Independent Study Courses and Tutored Courses

Registration for independent study courses requires submission in advance to the departmental office of an authorization signed by the person who will supervise the independent study. The area of study should not duplicate, overlap, or anticipate being a part of research undertaken for a thesis, nor should it in effect duplicate formal courses available. Exceptions may occur when 300 or 400 level courses are taken by graduate students as independent study courses with additional work giving them graduate stature.

Independent Study may not be offered to satisfy any part of the minimum requirements for an optional minor at the graduate level. The maximum number of credits of Independent Study offered as a part of the course requirements for any advanced degree is not specifically limited, but any total (of independent study coursework) over 6 semester hours must be approved by the Graduate Committee. When a graduate student takes an undergraduate course as independent study, this does not count toward the 6 hours limit, but it must involve either extra work or reduced credit. In all cases, a graduate student must fill out an Independent Study Form in the Biology office in addition to normal registration for any independent study course taken.

Transfer from Provisional to Degree Status

All provisional degree students must apply through the Departmental Chairman to the Graduate School for change from provisional degree to degree status, preferably at the end of the first semester (with at least a minimal full-time load (see Sect. III, p.10) and no later than the end of the second semester. Approval by the Graduate School is virtually assured with 12 hours or more of B, but this usually requires a full year. Advisors and students are urged to request transfer after one semester if any convincing case can be made for it, e.g. grades above B level, success in difficult courses, strong faculty recommendations, etc. The advisor then recommends to the Chairman of the Department that 1) the student be informed he will not be allowed degree status in this Department, or, 2) that degree status be requested for him. If a student is denied degree status after the full probationary period he shall be denied the privilege of taking further graduate work in the Department.

Orientation Advising

All new graduate students are to report upon arrival to the Associate Chairman in the Biology office for assignment to a faculty advisor. The student should consult with that advisor and determine with him at least two additional graduate committee members. This information should then be communicated to the Biology office on the Advisory Committee Form.

Provisional degree students, and degree students of uncertain objectives, will be assigned by the Associate Chairman to a temporary advisor, who may become or be replaced by a permanent advisor as soon as the student's progress permits, during or as soon as possible after the first semester.

The record for each beginning student is reviewed by his advisor, in consultation with other committee members, to determine the most suitable course of studies for the first semester. A schedule for completion of coursework, foreign languages, examinations, and thesis research should be reasonably well codified by the end of the first year, and maintained as firmly as possible thereafter (see Degree Plan, below).

Any student is at liberty to change advisors at any time, with approval of the Chairman of the Division in consultation with the advisors concerned or, in case of interdivisional changes, in consultation with the chairmen of both divisions involved, without penalty of any sort.

Degree Plan

Every student working towards an advanced degree in this University is required to file in the Biology office a program of study, or degree plan, which he has prepared in consultation with his Advisory Committee. Blanks for this purpose (Outline of Proposed Degree Plan) may be obtained in the Biology office. The form, completed in triplicate, is submitted to the Divisional graduate program committee for approval. One copy each is retained by the faculty advisor, the Biology office, and the student. If a student in consultation with his advisor changes his degree plan or proposed schedule, a revised plan must be reported to the departmental office. Degree plans must be submitted to the Department by degree students not later than the end of the first year of residence as degree students in this University.

Overall Progress

The Biology Department Graduate Committee (Chairmen of the 3 Divisions, plus Associate Chairman of Department) is responsible for periodic review of all graduate students to determine eligibility for assignment of teaching assistantships, scholarships, etc., to assure that all are making satisfactory progress toward a degree.

Petitions

Any of the preceding regulations may be waived under special circumstances upon approval by the Chairman of the Department of a specific petition submitted by the student and, if necessary, relayed to the Graduate School.

THE MASTER'S DEGREE

Types of Master's Degrees

Only the degree Master of Arts is given by the Department.

Before the status of a graduate student has been established, he should, in consultation with his Advisor, decide on one of two plans leading to the Master's degree.

Plan I. In this plan a thesis is written based on original research. At least 24 semester hours of work are presented, including 6 for the thesis; a total of at least 12 semester hours, including thesis, must be at the 500 level or higher. The thesis hours may be taken during one or more semesters. This plan is not ordinarily available for graduate students enrolled in the Divisions of Environmental Biology and Population Studies.

Plan II. In this plan a minimum of 30 semester hours is presented without a thesis; at least 16 of the 30 must be at the 500 level or higher, and must include at least 2 hours of Independent Study involving research covering field, laboratory and/or library studies. This plan commonly leads to a terminal degree, primarily for secondary school teachers but also useful for certain others.

Major Advisor

As soon as the permanent Advisor has been chosen, the student should secure from the departmental office a form entitled "Graduate Advisory Committee Appointment". This form is completed, in consultation with the prospective faculty advisor, in triplicate; one copy is submitted to the Biology office, one is retained by the student, and one by the advisor. The form in essence is 1) a request for permission to work under the person designated; 2) a signed compliance of the faculty member concerned; 3) a list of two other members of the three-man Advisory Committee, selected from the Biology faculty; and, in the case of Plan I students, 4) a brief statement of the area of research contemplated, and 5) a suggested second reader for the thesis. The Degree Plan is also executed in triplicate (see Part III, p.11) at this time.

Transfer of Credit

Up to 8 semester hours of graduate credit may be transferred from recognized graduate schools if the credits have been earned five or fewer years before the Master's degree is awarded at this University, or are validated by special examination. Transfer of credit can only be made before the last semester begins and after a student has completed at least 6 hours and one term satisfactorily (at least B) at this school and has consent of the Department and the Dean of the Graduate School. The student wishing to transfer credits must present an official transcript to his major advisor and obtain his approval and that of the Departmental Chairman for the requested transfer of credits. After submission of the specific form required (obtainable from the Biology office), it is evaluated and approved or rejected by the Graduate School.

Graduate Majors

The major is "Biology" for all degrees granted in the Biology Department. Any courses taken in any department may, with the advisor's approval, be counted toward that major. No minor is required.

Course Requirements

There are no specific course requirements for the Master's degree, except 1) the courses required for admission; 2) two semester hours of any Divisional seminars, or their equivalent taken elsewhere, except for students attending only summer sessions; and 3) any additional general requirements of the student's Division. There is no foreign language requirement. Note the teaching requirement (p. 3).

Admission to Candidacy

A student ready to become a "candidate" for a Master's degree (i.e., to apply formally for the degree) must file application not later than 10 weeks prior to the Comprehensive Examination but not before all deficiencies are removed. The number of hours to be presented for the degree must be determined before this application may be filed. The application form is obtained from the departmental office whence it is relayed to the Graduate School after having been approved by the Advisor and Departmental Chairman.

Comprehensive Examination

A "Master's Comprehensive" examination should be taken no later than the 4th semester. Plan I (with thesis) Master's students take a written exam similar to that for Plan II students. Plan I students should take it prior to their last semester, allowing that semester to be devoted full time to the thesis; Plan II students should take the exam during their last semester. The results of the written exam are held until the student completes his thesis and takes an oral "defense of thesis" (see p. 9). At this time the Graduate School is notified of the results of the "B.A. Comprehensive - Final Examination," which includes both the written exam and the defense of thesis. (See Time Limitation, p. 3).

For students beginning their graduate study here without a Master's degree it is to be noted the M.A. Comps-Ph.D. Prelims are strictly the responsibility of the Divisions. There are to be no department-wide, communal examinations for graduate students at any level. However, examinations for all students must conform with divisional standards, and the Executive Committee must approve those standards. Each Division is responsible for maintaining adherence to the prescribed standards for all students in that Division.

1. In the Division of Environmental Biology, all M.A. Comps-Ph.D. Prelims are communal to be given by a divisional committee. These will be given once each semester, formally in early November and early April.
2. In the Division of Organismic Biology, students intending to go on for the Ph.D. degree at CU take an individual examination from their Advisory Committees. Those intending to terminate their graduate study, at least at CU, with a Master's degree, take a communal examination administered by a divisional committee once each semester, normally in early November and early April. Those uncertain of their post-Master's objectives take the communal examination. In all cases, the examination must conform with the regulations. Those taking the communal exam must take an individual Ph.D. Prelim if they qualify and decide to continue at CU for a Ph.D. degree.
3. In the Division of Population Studies, all students take an individual examination from their Advisory Committee, as in 2 above.

Components of the M.A. Comprehensive exam are:

1. Written Section - Several weeks before the examination is given, the examining committee prepares a written examination to be given over a period of one to several days, at the discretion of the committee. The examination is designed to test the candidate's over-all and integrated knowledge of Biology in his Division, utilizing evidence from related areas desired or appropriate to illustrate basic biological concepts.

The candidate will be expected at least in some areas to demonstrate a depth of understanding developed by reading beyond the normal coursework. The Committee will notify the student in advance of the basic plan and schedule for the examination; it also notifies the Biology office that the student is to take the examination as well as his ultimate scores. All members of the Committee evaluate each candidate with a recommendation for a grade level being determined on the basis of majority vote of the Committee.

2. Oral Section - A general (as opposed to a "defense of thesis") supplementary oral examination may be given, if the examining Committee desires, for either Plan I or Plan II Master's degree candidates. If it is given, it must follow the written component within two weeks. The student is notified when the results of evaluation of the written section are reported to him whether an oral will be required.

The ratings assignable to the Comprehensive Examination are superior, satisfactory and unsatisfactory.

1. Superior - this permits a student to obtain the M.A. upon completion of all requirements.

The terminal M.A. students in the Environmental Division are administered a communal exam which permits, if given a superior rating, the bypass of the Ph.D. Prelims if the student elects to pursue the Ph.D. degree.

The terminal M.A. II student in the Organismic Division who has been given the communal exam must take the Ph.D. Prelim if he decides to go on for the doctorate. If an individually structured test has been given to an M.A. candidate, as in the case of the M.A. I candidate, he may, with a superior rating, continue on to the Ph.D.

All students in the Division of Population Studies take an individual examination from their Advisory Committees.

The above assumes the student has been accepted for the doctorate by the Department and by a specific member of the Graduate Faculty who agrees to direct the thesis. He must submit to the Biology Department a new Part I of Application for Admission.

2. Satisfactory - this is adequate for the achievement of the Master's degree.

3. Unsatisfactory - this is basis for a recommendation by the Committee to: (a) drop the candidate from the graduate program of the Department; (b) recommend one further attempt, with a second performance at the "unsatisfactory" level being reason for dropping the candidate from the graduate program of the Department.

The Dissertation

Before writing a dissertation, Plan I students should obtain a copy of "Thesis Specifications" from the Biology office or the Graduate School office and follow directions

meticulously. The thesis must be approved by both the first and second readers at least 30 days before the Commencement at which the degree is to be conferred. Two formally approved copies of the thesis must be filed in the office of the Graduate School two weeks before the degree is conferred, and two copies with the Department (including one for the advisor).

Oral "defense of thesis"

The Committee which conducts the "defense of thesis" oral examination of Plan I Master's degree candidates is the candidate's own Advisory Committee. The examination must be held at least 30 days in advance of the thesis-submission deadline of the Graduate College. The thesis should not be in final form at this time, but as nearly final as possible so that changes and corrections suggested by the Committee may be incorporated.

As a general policy, no student should attempt completion of Plan I degrees in the period between the end of the summer session and the following October 1.

TYPICAL SCHEDULE OF DEADLINES FOR MASTER'S CANDIDATES (See Catalog for precise dates in given years.)

Orientation advising	First registration in Graduate School
Advisory Committee appointed	As soon as possible or at least by the end of the first semester
Degree Plan filed	As soon as possible or at least by the end of the first semester
Recommendation to Graduate School for removal of provisional status	After all deficiencies removed; after first semester but no later than second semester
Comprehensive Examination	As soon as possible, and no later than 4th sem.
Degree Candidacy	After removal of all deficiencies, and at least 10 weeks before date for report of Comprehensive Exam
Approval of thesis for final typing	About 6 weeks before end of terminal degree session
Final Examination (defense of thesis, for Plan I students only)	About 6 weeks prior to end of session when degree is to be awarded
Thesis filed in Graduate School	Two weeks prior to end of session when degree is to be awarded
Completion of all requirements for degree	Ordinarily within 2 years for full-time students, 5 years or 7 successive summers for part-time students, after beginning of work for degree. If the Comprehensive is not passed, a maximum of one additional year may be approved by the Advisory Committee.

THE Ph.D. DEGREE

Admission to Ph.D. Study

A. Students with a C.U. Master's degree. Any student obtaining a Master's degree from C.U. may continue study toward a Ph.D. degree only if 1) a "Superior" rating was received in the Master's Comprehensive - Ph.D. Preliminary Examination; 2) a satisfactory rating was received on his Final Oral Examination, if any (Plan I students); 3) he has the approval of his Advisory Committee; 4) he has been accepted by an Advisor for Ph.D. study; and 5) has received approval by the Graduate School of his new 'Application' (Part I only).

B. Students with a non-C.U. Master's degree. Students with a Master's degree from a university other than C.U. must have 1) at least a 3.0 average in both undergraduate and graduate courses in biology; 2) favorable recommendations from faculty members familiar with their graduate study, including evidence of approval for study toward the doctoral degree; 3) evident dedication to scholarly study, instruction, and research; and 4) acceptance by a possible Advisor or by the Department, based upon correspondence of interests and availability of facilities. The Ph.D. Appraisal Comm. will have determined insofar as possible that the applicant is sufficiently outstanding to be regarded on a par with C.U. students earning a "superior" rating in their M.A. Comprehensive - Ph.D. Preliminary Examination.

C. Students without a Master's degree. Students without a Master's degree who wish to bypass the Master's degree enroute to the Ph.D. must 1) have the same entrance requirements as applicants for the M.A. degree; 2) be accepted by an Advisor for Ph.D. study; and 3) obtain a "Superior" rating in their Ph.D. Preliminary Examination. This last rating may be accorded even if a weakness is observed in a field other than the major field of study, when required additional courses have been completed with a B average (cf. p. 12).

Residence Credit Requirement - full load

Registration is required in order to earn residence credit (see Graduate Catalog for definition). The minimum requirement is a total of 6 semesters beyond the Bachelor's degree. No more than 2 may be allowed for a Master's degree. At least 4 must be earned at this University, and at least 2 must be consecutive in one academic year.

Students employed 1/4 time or less earn full residence credit. Those employed more than 1/4 time but less than 3/4 time earn 3/4 residence credit. After passing the Ph.D. Comprehensive, a student must maintain registration (at minimum fee, however, irrespective of hours for which enrolled) every semester (no summers, unless desired) until the degree is awarded or the student withdraws his candidacy. For Selective Service and GI Bill purposes, full-time is regarded as 8 hours (assistant's work is counted in this) of courses, or full-time thesis work. For residence credit only, full-time requires 5 hours at 500 or 600 level, or 8 hours of other graduate work, or full-time thesis work. Full load for summer is 3 hours at 500 or 600 level, or 6 hours of other graduate work, or thesis.

Course Requirements

A. Entrance requirements. Applicants for study toward the Ph.D. degree are required to have the same background coursework as applicants for study toward the M.A. degree (see Introduction), except that the undergraduate grade point average is not an essential factor if a Master's degree is already held. Any deficiency in these requirements is to be removed as soon as possible (see Introduction).

B. Subsequent requirements. Five requirements relating to coursework beyond the entrance level must be met before the Ph.D. degree can be granted. 1) At least 46 semester hours of courses beyond the Bachelor's degree numbered 500 or above, including 16 thesis hours, are required. Twenty of the total of 30 non-thesis hours must be in graduate courses taken at this University, and no more than 6 should be accepted in graduate Independent Study without consent of the advisor. By petition after the first full-time semester (or equivalent), a maximum of ten semester hours of graduate course work acquired at some other university may be transferred toward fulfillment of the non-thesis semester-hour requirement. Students may use all 500, 600 and 700 level course work taken at this University to count toward the minimum requirement for the Ph.D. 2) At least four semesters of Divisional seminars, or their equivalent taken elsewhere, must be completed satisfactorily. 3) The specific course requirements imposed by the particular Division and Advisor involved must be fulfilled. 4) At least second-year college proficiency (total 12 semester hours) or equivalent (e.g. native proficiency) in a language other than English must be registered at a C-level or better for the last semester (see the Graduate Catalog for details). 5) Fulfillment of unsatisfied parts of the language and seminar requirements should be started the first year and, unless approved by the Advisory Committee, continued without interruption until complete. Note also the teaching requirement (p. 3).

Advisory Committee

By the end of the first semester, the student is to submit to the Biology office a form ("Graduate Advisory Committee Appointment") which 1) requests permission to work with the Advisor designated, 2) bears agreement by signature of the designated person to act as Advisor, 3) specifies area of thesis research contemplated, and 4) designates two additional members of the Advisory Committee. The functions of this three-man Committee are to aid the student in his research objectives, to ensure against too narrow a specialization, and to assure depth of investigation. It is the responsibility of the Advisor to notify members of the Advisory Committee of their appointment. Any change in membership of the Advisory Committee must be reported by submission of another revised form giving the new membership. Students obtaining their Master's degree under the same Advisor as selected for the Ph.D. degree retain the same Advisory Committee. Changes in personnel can be made only with the consent of all concerned. (See Orientation Advising, p. 4)

When the thesis advisor is a member of some other academic unit of the University, a voting member of the Biology Department must serve as "Co-advisor" for the student. The composition of an advisory committee must be submitted to the Biology Department Graduate Committee (Division Chairmen plus the department Assoc. Chairman, as Chairman of the Committee) for review when first proposed and before becoming official. Composition of Ph.D. Comprehensive & Thesis Committees require similar approval (see pp. 12-14)

Degree Plan

The first duty of the Advisory Committee is to review the student's background and to work out with him a program of academic studies towards the degree. This program should be made out by the Advisor in triplicate on the Degree Plan forms available from the Biology office. One completed copy is submitted to the Department for the Student's departmental file, one is retained by the student, and one by the Advisor. If a student changes his degree plan, a revised plan must be similarly reported. The Advisor and student should keep their copies up-to-date, as running records of academic progress.

Preliminary Examination

In accordance with Graduate School rules, this exam must be written, but may be followed by an oral, at the discretion of the examining committee. The written portion shall consist of two 3 hour sessions, and a copy of the exam shall ultimately be placed in the student's folder in the office.

a. This exam is required of all students who wish to proceed directly to the Ph.D. and bypass the Master's ("superior" grade necessary, see page 8).

b. For students who have received their M.A. at Boulder, a grade of "superior" on the M.A. Comp/Ph.D. Prelim qualifies them to proceed directly for the Ph.D.

c. If a grade lower than "superior" is made by any student in the above two categories, the student must retake the exam passing it at the "superior" level, if he wishes to continue for the Ph.D. The student may retake the examination only once, and must do so during the next semester of regular academic year.

d. Students who received their M.A. prior to coming to Boulder for the Ph.D. will be interviewed and appraised by the Graduate Committee during their first month as Boulder graduate students. The Graduate Committee can request a student to make up any deficiencies which become apparent during this interview, and can require the student to take the Ph.D. preliminary should it be deemed necessary. To conform with Graduate School regulations, minimally a written statement of each student's objectives must be required.

Admission to Candidacy

Formal application for admission to candidacy for the Ph.D. degree cannot be made until 1) completion of at least 4 semesters of full-time residence, and 2) language and seminar requirements are fulfilled; however, formal acceptance of fulfillment of language requirements, by the Graduate School, is not granted until Candidacy is approved. It must be made no later than two weeks before the Ph.D. Comprehensive Examination is to be given. Blank forms may be obtained from the Biology office, and are to be executed in duplicate and returned to that office for formal departmental approval and submission to the Graduate School. Once certified as a candidate, enrollment must be maintained every regular (not summer) semester until the final is passed, at a standard (usually \$70.00) fee, which permits enrollment in any coursework desired, for credit. Registration after the final exam is passed is not required, although the degree is not granted until the thesis is accepted.

Comprehensive Examination

Upon completion of essentially all required formal coursework for the Ph.D. (i.e. excluding thesis and/or Independent Study), a written and oral Comprehensive Exam must be taken. Although only a 9 month interval is required between Comprehensive and Final Examinations, it is to the interest of the student to complete formal coursework and to pass the Comprehensive Examination as quickly as possible. An added inducement is the fact that after Comprehensives are passed only the minimal registration fee is charged irrespective of number of hours for which the student enrolls. It is generally recognized that this examination is the major hurdle of the doctoral degree program, assuming that the dissertation is competently pursued and executed. Its purpose is, however, to test competence in the student's general area of specialization. The Advisory Committee must advise the student, at least 3 months in advance, of the scope, depth, and general nature of the examination. In practice, the Comprehensive Examination covers the area of specialization and peripheral disciplines, and it is organized in any appropriate 4 disciplinary areas (e.g. Reproductive Endocrinology, Histology, Gross Anatomy, Systematic Herpetology, irrespective of existence of formal or informal departmental representation); it does not concern itself with the dissertation itself.

The Comprehensive Examination Committee conducts the examination. The Committee consists of the student's Advisory Committee (3 members) plus any two additional members (either or neither from outside the Department) selected by that Committee in consultation with the student. The written part of the examination is divided into four half-day sessions within a 7-day period and is followed within two weeks by an oral examination. The oral examination is open to all members of the faculty.

For the written section, questions may be given to the student in advance so that he may prepare himself for writing answers during the examination period. In this case the questions shall be rather detailed and require library research, intelligent synthesis of ideas, and considered speculation. Alternatively, questions may be given out only at the examination time, in which case they should be of a more general nature. The type of written exam is to be determined by the student and his committee, and may consist of either type of question, or both. It is understood that regardless of the type of written questions given, the oral portion may legitimately cover any subject within the four designated "areas".

At least a week before the Comprehensive Exam is scheduled to be given, the student or his Advisor is to notify (on the "Ph.D. Comprehensive Examination" form available in the Biology office) the Biology office of the student's name, the date and time of the exam, and the names of the 5 committee members. This information is relayed by the Biology office to the Graduate School, which returns a report form to the Advisor. This must be marked "Satisfactory" or "Unsatisfactory", and signed by all Committee members, at the end of the oral, and returned to the Biology office for relay to the Graduate School.

A successful candidate must receive the affirmative votes of at least three-fifths of the members of the examination board. In case of failure, the examination may be attempted once more, after no less than one full semester.

If a student fails to complete all requirements for the degree within four years of the date on which the Comprehensive Exam was passed, a second Examination by the same Committee, similar in extent to the first, will be required before the candidate may take the final examination. If this second Comprehensive Exam is failed, it may be attempted once more after no less than one full semester. Registration must be maintained every semester (not summer) after the comprehensives are passed, until the final is passed.

Dissertation

This dissertation must be based upon original investigation and must show mature scholarship and critical judgment, as well as familiarity with tools and methods of research. It should be a ~~worth while~~ contribution to knowledge in the student's special field. The thesis project, plan, and progress should be known to and approved by the entire Advisory Committee from the beginning of the research and throughout its pursuit, so that no major last-minute revisions will be necessary.

The dissertation must be finished and submitted in typewritten form at least 45 days before the date of graduation and must be available for inspection by the examining committee before the final examination may be undertaken.

In mechanical features, all dissertations must comply with specifications obtainable from the Biology office. One formally approved, printed or typewritten copy must be filed in the office of the Dean at least two weeks before the date on which the degree is to be conferred. Two other identical copies must be supplied to the Biology Department, one destined for the student's Advisor.

The student must notify the Graduate School at least 6 weeks before he expects degree conferral of the exact title of his dissertation. The title will appear on the Commencement program.

Directions for submission of the Final Examination Notice should be obtained from the Biology office; similar directions for the Dissertation Abstracts manuscript, and data for the Survey of Earned Doctorates, must be obtained at the Graduate School office several weeks before the Final Examination is taken. The notice must be returned at least 2 weeks before the examination, and the other forms must be submitted with the dissertation to the Graduate School. A \$25.00 fee is payable at that time.

Ph.D. degree students may register for as many semesters as they wish for thesis, but there must be a minimum of 16 hours and no more than 24, with no more than 8 taken in any one semester; enrollment in it must be continuous until the degree is awarded. No more than 8 can be taken before the Comprehensive Exam is passed. Until the thesis is finished the grade is recorded as IP for each semester, and when finished should be graded.

Publication of dissertations is not required but is strongly recommended, in whatever form is most appropriate, in full or in part, as one work or as several. Publication of all or any part of any dissertation prior to award of the pertinent degree (M.A. or Ph.D.) is permissible only by approval in advance of the student's Advisory Committee, furnished by letter, one copy of which must be placed in the student's departmental file, and one in the Graduate School file. If a substantial part of the dissertation has not been accepted for publication within two years after the degree was awarded, the thesis Advisor has the option of using the material for publication under joint authorship.

Seminar

All Ph.D. candidates must present the substance of their dissertations to a Forum, Seminar or Colloquium, after the work has progressed far enough to provide a pattern, and before completion to a point preventing use of appropriate modifications that might be suggested.

Final Examination

After the thesis has been accepted, a final examination on the thesis will be conducted. The thesis must not be in final form at this time; the opportunity must remain for corrections observed by the readers to be inserted. The examination is conducted by a committee of at least five members, including the student's Comprehensive Examination Committee and at least one professor from outside the Biology Dept. The Department requires approval and signatures of three readers (not two as per graduate school requirements). Designation and substitution for readers must be made well in advance of the final and with the approval of all concerned. The readers cannot sign the thesis until the seminar over it has been presented. Changes in personnel can be made only with approval of all concerned. The Advisor notifies the Biology office at least 2 weeks before the examination is to be held of the student's name, the date, time and place for the examination, and the names of the 5 or 6 committee members. This information is relayed to the Graduate School, which sends a Report form, grade card and copies of the Leaflet (see preceding) to the Biology office for distribution. Immediately after the examination the Report is marked "Satisfactory" or "Unsatisfactory", signed by all members of the Committee, and is returned with the completed grade card to the Biology office for relay to the Graduate School.

More than one dissenting vote will disqualify the candidate in the final examination. A student must be registered at the time he takes the final examination. It is advised that no student attempt completion of the degree in the period between the end of the summer session and the following October 1. The final examination must be completed at least three weeks before the intended date of graduation.

TYPICAL SCHEDULE OF DEADLINES OF Ph.D. CANDIDATES
(See Catalog for precise dates in given years)

Entrance Qualifying Examination	First registration in Graduate School
Advisory Committee appointed	As soon as possible, or by the end of the first semester
Preliminary Examination	Without M.A. or with C.U. M.A. degree, by 4th full-time semester after enrollment; with a non-C.U. M.A. degree, by end of 2nd semester (whether full-time or not)
Language Examination and Seminar	During first year and by usually uninterrupted registration thereafter until complete
Application for candidacy filed	By two weeks prior to Comprehensive
Comprehensive Examination - Written - Oral	At least 9 months before Commencement No more than 2 weeks later
Completed thesis available to Committee	At least 7 days prior to Final Examination
Final Examination (Defense of Thesis)	At least 3 weeks prior to Commencement
Thesis filed in Graduate School	At least 2 weeks prior to Commencement
Completion of all degree requirements	Within 3 years after admission with an M.A. degree, 4 years if no M.A. degree sought

A CHARTER FOR THE DEPARTMENT OF BIOLOGY
OF THE UNIVERSITY OF COLORADO

Adopted November 13, 1968

Preamble.

The Department of Biology, which presently includes faculty members at the Centers in Denver and Colorado Springs, adopts the following Charter to supersede its present Standing Rules. It is accepted for a trial period of three years, after which the Dean, in consultation with the Department, is to decide upon the organizational pattern to be followed thereafter. This Charter includes only the Boulder campus, since the faculty at the Centers are autonomous in all matters except those of certain curriculum matters, which will be handled by a joint Curriculum Committee, and the acquisition of new faculty, whose affiliations will be in this Department, which will be initiated by the Centers and reviewed by the Executive Committee in Boulder. The Department of Biology faculty at the Centers will remain regular members in the Department as professors-at-large, with probabilities for joint affiliations in the Divisions to be decided upon in each individual case.

The purpose of this reorganization is to facilitate the development of the Department into an outstanding center of biological teaching and research. It will be the responsibility of each administrative unit continually to assess the directions of biology and to implement measures which will keep the University abreast of new developments.

1. The Department.

The Department comprises four Divisions: Basic Biology, Environmental Biology, Organismic Biology, and Population Studies. Each faculty member shall be assigned to that Division in which his chief research and advanced teaching interests lie.

The Division of Basic Biology deals with a common departmental core program, especially for the first two years of study.

The Division of Environmental Biology deals with interactions between organisms and their environment, including field, distributional, and experimental studies.

The Division of Organismic Biology deals with comparative, descriptive, and experimental studies of organisms as individuals, with the main emphasis on physiological and morphological approaches.

The Division of Population Studies deals with theoretical, mathematical, genetical, and historical approaches to populations and to evolutionary problems.

While these four units are semi-autonomous, the program in biology remains unified through designation of all courses as biology. These units may be further subdivided into laboratories or joint programs for special research and graduate training, with the consent of the Executive Committee, but each has the responsibility of teaching in its field. Teaching in the Division of Basic Biology shall be by faculty members from the other Divisions, in which their advanced teaching and research are centered.

Each Division carries on its traditional functions, including preparation and administration of its separate budget, advanced teaching of both undergraduates and graduates, initiation of appointments and promotions of both faculty and non-academic staff, faculty research, and divisional upkeep.

The Department has both academic and non-academic functions. The former include undergraduate and graduate teaching, research, and inter-divisional graduate training programs. The non-academic functions include overall budget control, the acquisition and maintenance of facilities and equipment as well as public relations, alumni contact, and student information. The Department has overall control of faculty assignments and recruiting.

11. The Faculty.

All regular members of the teaching, research, and administrative staff of the Department, with the rank of assistant, associate, or full professor, and professor-adjoint, belong to the voting faculty.

Faculty meetings will be presided over by the Chairman of the Department, or by an alternate approved by him and the Executive Committee. Meetings will be conducted according to the latest edition of Robert's Rules of Order.

Each Division of the Department sets its own rules for meetings and policy matters, but such rules should be approved by the Executive Committee.

III. The Administration.

A. The Chairman of the Department.

The Department is administered by a Chairman, who is nominated and selected by a majority vote of the faculty under the Laws of the Regents. His term of office is four years and he may be reelected. The Chairman of the Department is charged with supplying leadership to the Department, serving as its spokesman to the Dean, and pursuing the public relations needs of the Department. On his own initiative, by request of the Executive Committee, or by request of ten faculty members, he shall call meetings of the Faculty of the Department for the discussion of matters of interest to the Department as a whole. There shall be at least one Departmental faculty meeting each semester.

The Chairman of the Department functions as the Chairman of the Executive Committee and as an ex officio member of all other Departmental committees, and casts the deciding vote in case of a tie. He consults with the Curriculum Committee with respect to the formulation of inter-divisional curricular policies and educational programs. He is responsible for coordinating the activities of the faculty and non-academic staff. The Chairman of the Department, with the advice and consent of the Executive Committee, appoints new committees and redefines the functions of the Department as the need arises. He is charged with reviewing recommendations for all appointments, reappointments, promotions, nominations for tenure, and salary increases within the Divisions and with transmitting them to the Dean with his recommendations.

The Chairman of the Department is responsible for the implementation of special interdivisional curricula and programs. He makes the initial screening for admission of graduate students and supervises the interdivisional programs for teachers at secondary and junior college levels.

The Chairman of the Department is responsible for the departmental budget and for expediting such coordination among the divisional budgets as may be called for and for transmitting them through the Executive Committee to the Dean with his recommendations. He also reviews building, space, and equipment needs of the Department, coordinates divisional and interdivisional requirements, integrates construction design, and makes presentation of the needs to the proper university officials. He also represents the Department to outside agencies and assists in the preparation of requests for outside aid. He consults with the Executive Committee on all matters regarding policy and other business that needs to be decided upon on a broad basis.

If need arises, the Chairman of the Department may, with the consent of the Executive Committee and the Dean, appoint an Associate Chairman to whom he may delegate some of his functions.

B. The Chairmen of the Divisions

Each Division is administered by a Chairman, who is responsible to the Chairman of the Department and to the Executive Committee. Each Division Chairman is selected by a majority vote of the faculty of that Division. Except during the trial period, when it is desirable to maintain flexibility of chairmanship (renewable at the beginning of each academic year), the term of office is coincident with that of the Chairman of the Department.

The Chairmen of the Divisions supply leadership to their groups. They are responsible for the administration of their units according to the policies established by the Division and the Department. Their responsibilities involve: (1) initiation and presentation of budget requests, including salary increases and administration of divisional budgets; (2) initiation of new appointments and of promotions of divisional faculty; (3) organizing and planning of divisional teaching and of divisional undergraduate and graduate programs including essential service courses; (4) divisional research and admission of graduate students to divisional programs; (5) hiring and promotion of divisional non-faculty personnel; and (6) upkeep of offices, laboratories for instruction and research, and all other facilities specifically identified with the Divisions.

The Chairmen of the Divisions may appoint committees to assist them in their duties, and the units may decide to elect special or permanent committees.

The Chairmen of the Divisions have the right to appeal to the Dean on matters of policy or issues that fail to receive support of the Executive Committee or the Chairman of the Department, but this shall be done only after the Executive Committee and the Chairman of the Department have been notified of their intent.

C. The Executive Committee.

The Executive Committee is composed of the four Chairmen of the Divisions, one regular faculty member who is appointed by the Chairman of the Department with the approval of the other members of the Committee, and the Chairman of the Department, who functions as its chairman without a vote, except to break a tie. It is the responsibility of the Executive Committee to advise the Chairman of the Department on all matters related to policies of the department as a whole and on the delegation of responsibilities to the divisions and their chairmen. The Executive Committee assists the Chairman of the Department in coordinating the budgets that are presented by the Chairmen of the Divisions. It also makes recommendations on allocation of faculty to the various divisions. The Executive Committee advises the Chairman of the Department, after consultation with the respective divisions, on new faculty appointments, reappointments, promotions, salary changes, and termination of employment. It advises the Chairman of the Department on assigning teaching assistants to the various units and decides upon methods to be followed in the selection and examination of graduate students. The Executive Committee continually assesses the directions of biology in order to keep the Department abreast of all modern developments. Decisions of the Executive Committee may be referred to the entire faculty when ten faculty members so require.

IV. Standing Committee

Curriculum Committee

The Curriculum Committee consists of one representative from each of the Divisions and from the Departments of Biology at the Centers in Denver and Colorado Springs, and the Chairman of the Department as an ex officio member. It shall elect its own chairman. This Committee studies the various existing curricula and course offerings and submits recommendations on their continuation and changes in the Divisions to the Chairman of the Department and the Chairmen in the Centers and to the Executive Committee. The Committee also studies the need for new courses, curricula, or training programs, and makes recommendations to the Executive Committee and the Chairman of the Department. It may receive from the various Chairmen, the Divisions in Boulder and the Departments at the Centers, university administrative officers, or any individual faculty member suggestions for studies of the kind mentioned above.

ROUTINE OF PROCEDURES
LEADING TO ADVANCED DEGREES IN THE
DEPARTMENT OF BIOLOGY

ROGERS
Rev. 1-72

I
GENERAL REGULATIONS

Admission

Each applicant should obtain a copy of the Graduate Catalog, supplied through the admissions office, 125 Regents Hall. Upon admission he is responsible for fulfillment of deadline and procedural requirements of that Catalog and of this Outline. Foreign applicants must request, execute and return at once to the Biology Department a pre-application form, on which basis the department advises the applicant whether to make formal application for admission. Approval of pre-application does not imply approval of application. If application is permitted, the forms are actually sent through the Graduate and International Student Admissions Office, which forwards the completed application to the Biology office.

Otherwise, application for admission to the Graduate School as a graduate biology student is made to the Department of Biology. For those intending to work towards a Master of Arts as well as a Ph.D., please indicate both degrees on the application, otherwise the intended one degree (M.A. (I or II, or Ph.D.) is indicated. The forms provided each applicant also cover scholarships, fellowships, and teaching and research assistantships. Two copies of official transcripts of all academic work must be filed with applications. All information should be returned to the Department of Biology. Applications should be submitted not less than two months before opening day of the term for which admission is sought. Indication on the application of the preferred Division (Environmental, Organismic, Population Studies) of the Department is helpful.

Applications for University admission must be accompanied by scores for the General Aptitude Test (Verbal, Quantitative) and the Advanced Test in Biology of the Graduate Record Examinations. GRE Scores should be sent directly to the Department of Biology from the Educational Testing Service at Box 1502, Berkeley, California 94701, or Box 955, Princeton, New Jersey 08540.

The appropriate Divisional graduate program committee of the Department reviews these documents as soon as competitive files are complete. Shortly before given deadlines, the committee recommends to the Departmental Graduate Committee: 1) acceptance of the applicant as a degree student (a student who may proceed towards a degree, and may select a graduate faculty member as a major advisor and chairman of his degree committee); 2) acceptance of the applicant as a provisional degree student (a student with several important deficiencies, a questionable academic record, or both, and hence on probation; such a student may not immediately proceed towards a degree nor can he formally select a graduate faculty member as a major advisor); 3) rejection of the application.

Upon review of credentials, applicants are notified of the decision of the Department and/or Graduate School. Only the Graduate School can issue a formal, valid admission and it also makes the final decision on status. The departmental recommendation is recorded on each application after it is reviewed. If an applicant is accepted as a degree or provisional degree student, he is sent a permit to register. His application and all pertinent correspondence are filed in the departmental office. If the student is not accepted, he is so notified and all documents are kept on file for one year. Transcripts indicating courses "In Progress" pending receipt of degree must be replaced by official transcripts showing proof of degree awarded. All applicants are admitted subject to completion of anticipated degrees.

Admission is completely independent of all forms of appointments.

Registration

All students appear at the University on the dates designated for counseling and registration. At the departmental office, Ramaley 110, they are referred to the appropriate Division and thence to advisors (see "Orientation Advising") for review of background, determination of deficiencies, if any, and formulation of a preliminary program (this constitutes the "Qualifying Examination" of the Graduate Catalog). They then proceed with registration.

Admission Requirements

To qualify as a degree student an applicant lacking a Master's degree must have: 1) a baccalaureate degree; 2) an undergraduate major, or equivalent thereof, in some biological area, including at least 8 semester hours of General Biology (or a combination of General Zoology and General Botany), 3 semester hours of Genetics, and 19 additional semester hours; 3) appropriate ancillary coursework, in mathematics, physics, and chemistry; 4) a gradepoint average of 3.0 for both (a) all undergraduate courses and (b) all courses in biological subjects; 5) other specific requirements, if any, of the Division entered. Admission cannot be granted even on provisional status if the gradepoint average is less than 2.75 for either (a) undergraduate courses or (b) biological courses collectively.

Students lacking these minimal requirements have deficiencies that must be removed by credit courses taken during the first year (and preferably the first semester); deferral to the second year is permissible only insofar as removal the first year is prevented by schedule conflicts. Deficiencies that can be removed by courses at the 400 level or higher count toward the graduate degree, if eligible.

Even where no deficiencies exist, the Department may require certain courses, whether applicable to the degree sought or not, if the individual advisor or Advisory Committee so requests. Such requirements are designated solely in the interest of competence in the candidate's field.

Courses regarded as deficiencies can be considered removed (a) in non-biological undergraduate courses if a minimum grade of C is earned, (b) in biological and graduate courses only if a minimum of B is earned. Any coursework that is "proficiency" is acceptable. Admission requirements for students with a Master's degree are given in Section III of this Outline.

Minimal Performance Criteria

The Biology Department requires that all graduate students possess a cumulative gradepoint average in biological courses taken while a graduate student in CU of no less than 3.0 at the end of each full scholastic year in order to register the following year. Reappointment eligibility of assistants also requires satisfactory pedagogic performance and satisfactory academic progress. In addition, the Graduate School demands that, except for the Ph.D. degree, a 3.0 av. must be obtained either in all work offered for the degree, or in at least the minimum required hours. For the Ph.D., courses receiving less than a B cannot be counted toward the degree, and a 3.0 av. is required in all work attempted in Graduate School. A student placed on probation by the Graduate School may be suspended subsequently; he should consult with his Advisor at once upon receipt of such notice. Action of the Advisory Committee is required at once upon notice of a possible suspension, recommending a course of action to the Department Chairman.

Time Limitations

With rare exception, the Department restricts degree and appointment eligibility for full-time Master's degree students to two years and for full-time Ph.D. students to three post-Master's years (or four years, if no Master's degree is held). Part-time or irregular applicants for the Master's degree must complete all degree requirements within five years or seven successive summers; those for the Ph.D. degree must observe the Graduate School limitations. Minimum residence requirements are, for the Master's degree, two semesters or its equivalent in summer terms (5-wk. summer session = 1/3 semester, 8-wk. summer session = 1/2 semester); for the Ph.D. degree, six semesters or equivalent thereof are required. (See also Sect. III of this Outline.)

Choice of Degree Candidacy

A student enrolling without a Master's degree may declare his intention to secure a terminal Master's degree, or to seek a Ph.D. degree. In the latter case, the student may elect to secure a Master's degree enroute to the Ph.D., or to bypass the Master's degree. Bypass nevertheless requires that he pass the Comprehensive examination with a "superior" rating.

Special Provisions in Relation to Graduate Teaching

All candidates for advanced degrees in the Department of Biology who have not had at least one year of responsible teaching experience at the secondary school level or above are expected either (1) to be employed as at least a half-time teaching assistant for at least one year, or (2) to enroll for at least one year in Teaching Laboratory Biology (Biol. 405-6).

A teaching assistant working on a quarter-time basis shall not be limited in his registration beyond the limitation prescribed by the Graduate School for unemployed graduate students.

A teaching assistant employed on a half-time basis during a regular session shall not register for more than 9 nor fewer than 5 credit hours, regardless of the course numbers of the credit hours presented, except upon recommendation of the major advisor and approval of the Divisional and Departmental Chairmen.

A teaching assistant employed on a half-time basis during summer sessions shall not register for more than 4 credit hours regardless of the course numbers of the credit hours presented, except as above.

Independent Study Courses and Tutored Courses

Registration for independent study courses requires submission in advance to the departmental office of an authorization signed by the person who will supervise the independent study. The area of study should not duplicate, overlap, or anticipate being a part of research undertaken for a thesis, nor should it in effect duplicate formal courses available. Exceptions may occur when 300 or 400 level courses are taken by graduate students as independent study courses with additional work giving them graduate stature.

Independent Study may not be offered to satisfy any part of the minimum requirements for an optional minor at the graduate level. The maximum number of credits of Independent Study offered as a part of the course requirements for any advanced degree is not specifically limited, but any total (of independent study coursework) over 6 semester hours must be approved by the Graduate Committee. When a graduate student takes an undergraduate course as independent study, this does not count toward the 6 hours limit, but it must involve either extra work or reduced credit. In all cases, a graduate student must fill out an Independent Study Form in the Biology office in addition to normal registration for any independent study course taken.

Transfer from Provisional to Degree Status

All provisional degree students must apply through the Departmental Chairman to the Graduate School for change from provisional degree to degree status, preferably at the end of the first semester (with at least a minimal full-time load (see Sect. III, p.10) and no later than the end of the second semester. Approval by the Graduate School is virtually assured with 12 hours or more of B, but this usually requires a full year. Advisors and students are urged to request transfer after one semester if any convincing case can be made for it, e.g. grades above B level, success in difficult courses, strong faculty recommendations, etc. The advisor then recommends to the Chairman of the Department that 1) the student be informed he will not be allowed degree status in this Department, or, 2) that degree status be requested for him. If a student is denied degree status after the full probationary period he shall be denied the privilege of taking further graduate work in the Department.

Orientation Advising

All new graduate students are to report upon arrival to the Associate Chairman in the Biology office for assignment to a faculty advisor. The student should consult with that advisor and determine with him at least two additional graduate committee members. This information should then be communicated to the Biology office on the Advisory Committee Form.

Provisional degree students, and degree students of uncertain objectives, will be assigned by the Associate Chairman to a temporary advisor, who may become or be replaced by a permanent advisor as soon as the student's progress permits, during or as soon as possible after the first semester.

The record for each beginning student is reviewed by his advisor, in consultation with other committee members, to determine the most suitable course of studies for the first semester. A schedule for completion of coursework, foreign languages, examinations, and thesis research should be reasonably well codified by the end of the first year, and maintained as firmly as possible thereafter (see Degree Plan, below).

Any student is at liberty to change advisors at any time, with approval of the Chairman of the Division in consultation with the advisors concerned or, in case of interdivisional changes, in consultation with the chairmen of both divisions involved, without penalty of any sort.

Degree Plan

Every student working towards an advanced degree in this University is required to file in the Biology office a program of study, or degree plan, which he has prepared in consultation with his Advisory Committee. Blanks for this purpose (Outline of Proposed Degree Plan) may be obtained in the Biology office. The form, completed in triplicate, is submitted to the Divisional graduate program committee for approval. One copy each is retained by the faculty advisor, the Biology office, and the student. If a student in consultation with his advisor changes his degree plan or proposed schedule, a revised plan must be reported to the departmental office. Degree plans must be submitted to the Department by degree students not later than the end of the first year of residence as degree students in this University.

Overall Progress

The Biology Department Graduate Committee (Chairmen of the 3 Divisions, plus Associate Chairman of Department) is responsible for periodic review of all graduate students to determine eligibility for assignment of teaching assistantships, scholarships, etc., to assure that all are making satisfactory progress toward a degree.

Petitions

Any of the preceding regulations may be waived under special circumstances upon approval by the Chairman of the Department of a specific petition submitted by the student and, if necessary, relayed to the Graduate School.

THE MASTER'S DEGREE

Types of Master's Degrees

Only the degree Master of Arts is given by the Department.

Before the status of a graduate student has been established, he should, in consultation with his Advisor, decide on one of two plans leading to the Master's degree.

Plan I. In this plan a thesis is written based on original research. At least 24 semester hours of work are presented, including 6 for the thesis: a total of at least 12 semester hours, including thesis, must be at the 500 level or higher. The thesis hours may be taken during one or more semesters. This plan is not ordinarily available for graduate students enrolled in the Divisions of Environmental Biology and Population Studies.

Plan II. In this plan a minimum of 30 semester hours is presented without a thesis; at least 16 of the 30 must be at the 500 level or higher, and must include at least 2 hours of Independent Study involving research covering field, laboratory and/or library studies. This plan commonly leads to a terminal degree, primarily for secondary school teachers but also useful for certain others.

Major Advisor

As soon as the permanent Advisor has been chosen, the student should secure from the departmental office a form entitled "Graduate Advisory Committee Appointment". This form is completed, in consultation with the prospective faculty advisor, in triplicate; one copy is submitted to the Biology office, one is retained by the student, and one by the advisor. The form in essence is 1) a request for permission to work under the person designated; 2) a signed compliance of the faculty member concerned; 3) a list of two other members of the three-man Advisory Committee, selected from the Biology faculty; and, in the case of Plan I students, 4) a brief statement of the area of research contemplated, and 5) a suggested second reader for the thesis. The Degree Plan is also executed in triplicate (see Part III, p.11) at this time.

Transfer of Credit

Up to 8 semester hours of graduate credit may be transferred from recognized graduate schools if the credits have been earned five or fewer years before the Master's degree is awarded at this University, or are validated by special examination. Transfer of credit can only be made before the last semester begins and after a student has completed at least 6 hours and one term satisfactorily (at least B) at this school and has consent of the Department and the Dean of the Graduate School. The student wishing to transfer credits must present an official transcript to his major advisor and obtain his approval and that of the Departmental Chairman for the requested transfer of credits. After submission of the specific form required (obtainable from the Biology office), it is evaluated and approved or rejected by the Graduate School.

Graduate Majors

The major is "Biology" for all degrees granted in the Biology Department. Any courses taken in any department may, with the advisor's approval, be counted toward that major. No minor is required.

Course Requirements

There are no specific course requirements for the Master's degree, except 1) the courses required for admission; 2) two semester hours of any Divisional seminars, or their equivalent taken elsewhere, except for students attending only summer sessions; and 3) any additional general requirements of the student's Division. There is no foreign language requirement. Note the teaching requirement (p.3).

Admission to Candidacy

A student ready to become a "candidate" for a Master's degree (i.e., to apply formally for the degree) must file application not later than 10 weeks prior to the Comprehensive Examination but not before all deficiencies are removed. The number of hours to be presented for the degree must be determined before this application may be filed. The application form is obtained from the departmental office whence it is relayed to the Graduate School after having been approved by the Advisor and Departmental Chairman.

Comprehensive Examination

A "Master's Comprehensive" examination should be taken no later than the 4th semester. Plan I (with thesis) Master's students take a written exam similar to that for Plan II students. Plan I students should take it prior to their last semester, allowing that semester to be devoted full time to the thesis. The results of the written exam are held until the student completes his thesis and takes an oral "defense of thesis" (see p. 9). At this time the Graduate School is notified of the results of the "M.A. Comprehensive - Final Examination," which includes both the written exam and the defense of thesis. (See Time Limitation, p. 3).

For students beginning their graduate study here without a Master's degree it is to be noted the M.A. Comps-Ph.D. Prelims are strictly the responsibility of the Divisions. There are to be no department-wide, communal examinations for graduate students at any level. However, examinations for all students must conform with divisional standards, and the Executive Committee must approve those standards. Each Division is responsible for maintaining adherence to the prescribed standards for all students in that Division.

1. In the Division of Environmental Biology, all M.A. Comps-Ph.D. Prelims are communal, to be given by a divisional committee. These will be given once each semester, formally in early November and early April.
2. In the Division of Organismic Biology, students intending to go on for the Ph.D. degree at CU take an individual examination from their Advisory Committees. Those intending to terminate their graduate study, at least at CU, with a Master's degree, take a communal examination administered by a divisional committee once each semester, normally in early November and early April. Those uncertain of their post-Master's objectives take the communal examination. In all cases, the examination must conform with the regulations. Those taking the communal exam must take an individual Ph.D. Prelim if they qualify and decide to continue at CU for a Ph.D. degree.
3. In the Division of Population Studies, all students take an individual examination from their Advisory Committee, as in 2 above.

Components of the M.A. Comprehensive exam are:

1. Written Section - Several weeks before the examination is given, the examining committee prepares a written examination to be given over a period of one to several days, at the discretion of the committee. The examination is designed to test the candidate's over-all and integrated knowledge of Biology in his Division, utilizing evidence from related areas desired or appropriate to illustrate basic biological concepts.

The candidate will be expected at least in some areas to demonstrate a depth of understanding developed by reading beyond the normal coursework. The Committee will notify the student in advance of the basic plan and schedule for the examination; it also notifies the Biology office that the student is to take the examination as well as his ultimate scores. All members of the Committee evaluate each candidate's performance. The Committee then meets and jointly considers each candidate with a recommendation for a grade level being determined on the basis of majority vote of the Committee.

2. Oral Section - A general (as opposed to a "defense of thesis") supplementary oral examination may be given, if the examining Committee desires, for either Plan I or Plan II Master's degree candidates. If it is given, it must follow the written component within two weeks. The student is notified when the results of evaluation of the written section are reported to him whether an oral will be required.

* * *

The ratings assignable to the Comprehensive Examination are superior, satisfactory and unsatisfactory.

1. Superior - this permits a student to obtain the M.A. upon completion of all requirements.

The terminal M.A. students in the Environmental Division are administered a communal exam which permits, if given a superior rating, the bypass of the Ph.D. Prelims if the student elects to pursue the Ph.D. degree.

The terminal M.A. II student in the Organismic Division who has been given the communal exam must take the Ph.D. Prelim if he decides to go on for the doctorate. If an individually structured test has been given to an M.A. candidate, as in the case of the M.A. I candidate, he may, with a superior rating, continue on to the Ph.D.

All students in the Division of Population Studies take an individual examination from their Advisory Committees.

The above assumes the student has been accepted for the doctorate by the Department and by a specific member of the Graduate Faculty who agrees to direct the thesis. He must submit to the Biology Department a new Part I of the Application for Admission.

2. Satisfactory - this is adequate for the achievement of the Master's degree.

3. Unsatisfactory - this is basis for a recommendation by the Committee to: (a) drop the candidate from the graduate program of the Department; (b) recommend one further attempt, with a second performance at the "unsatisfactory" level being reason for dropping the candidate from the graduate program of the Department.

* * *

The Dissertation

Before writing a dissertation, Plan I students should obtain a copy of "Thesis Specifications" from the Biology office or the Graduate School office and follow directions

meticulously. The thesis must be approved by both the first and second readers at least 30 days before the Commencement at which the degree is to be conferred. Two formally approved copies of the thesis must be filed in the office of the Graduate School two weeks before the degree is conferred, and two copies with the Department (including one for the advisor).

Oral "defense of thesis"

The Committee which conducts the "defense of thesis" oral examination of Plan I Master's degree candidates is the candidate's own Advisory Committee. The examination must be held at least 30 days in advance of the thesis-submission deadline of the Graduate College. The thesis should not be in final form at this time, but as nearly final as possible so that changes and corrections suggested by the Committee may be incorporated.

As a general policy, no student should attempt completion of Plan I degrees in the period between the end of the summer session and the following October 1.

TYPICAL SCHEDULE OF DEADLINES FOR MASTER'S CANDIDATES

(See Catalog for precise dates in given years.)

Orientation advising	First registration in Graduate School
Advisory Committee appointed	As soon as possible or at least by the end of the first semester
Degree Plan filed	As soon as possible or at least by the end of the first semester
Recommendation to Graduate School for removal of provisional status	After all deficiencies removed; after first semester but no later than second semester
Comprehensive Examination	As soon as possible, and no later than 4th sem.
Degree Candidacy	After removal of all deficiencies, and at least 10 weeks before date for report of Comprehensive Exam
Approval of thesis for final typing	About 6 weeks before end of terminal degree session
Final Examination (defense of thesis, for Plan I students only)	About 6 weeks prior to end of session when degree is to be awarded
Thesis filed in Graduate School	Two weeks prior to end of session when degree is to be awarded
Completion of all requirements for degree	Ordinarily within 2 years for full-time students, 5 years or 7 successive summers for part-time students, after beginning of work for degree. If the Comprehensive is not passed, a maximum of one additional year may be approved by the Advisory Committee.

THE Ph.D. DEGREE

Admission to Ph.D. Study

A. Students with a C.U. Master's degree. Any student obtaining a Master's degree from C.U. may continue study toward a Ph.D. degree only if 1) a "Superior" rating was received in the Master's Comprehensive - Ph.D. Preliminary Examination; 2) a satisfactory rating was received on his Final Oral Examination, if any (Plan I students); 3) he has the approval of his Advisory Committee; 4) he has been accepted by an Advisor for Ph.D. study; and 5) has received approval by the Graduate School of his new "Application" (Part I only).

B. Students with a non-C.U. Master's degree. Students with a Master's degree from a university other than C.U. must have 1) at least a 3.0 average in both undergraduate and graduate courses in biology; 2) favorable recommendations from faculty members familiar with their graduate study, including evidence of approval for study toward the doctoral degree; 3) evident dedication to scholarly study, instruction, and research; and 4) acceptance by a possible Advisor or by the Department, based upon correspondence of interests and availability of facilities. The Ph.D. Appraisal Comm. will have determined insofar as possible that the applicant is sufficiently outstanding to be regarded on a par with C.U. students earning a "superior" rating in their M.A. Comprehensive - Ph.D. Preliminary Examination.

C. Students without a Master's degree. Students without a Master's degree who wish to bypass the Master's degree enroute to the Ph.D. must 1) have the same entrance requirements as applicants for the M.A. degree; 2) be accepted by an Advisor for Ph.D. study; and 3) obtain a "Superior" rating in their Ph.D. Preliminary Examination. This last rating may be accorded even if a weakness is observed in a field other than the major field of study, when required additional courses have been completed with a B average (cf. p. 12).

Residence Credit Requirement - full load

Registration is required in order to earn residence credit (see Graduate Catalog for definition). The minimum requirement is a total of 6 semesters beyond the Bachelor's degree. No more than 2 may be allowed for a Master's degree. At least 4 must be earned at this University, and at least 2 must be consecutive in one academic year.

Students employed 1/4 time or less earn full residence credit. Those employed more than 1/4 time but less than 3/4 time earn 3/4 residence credit. After passing the Ph.D. Comprehensive, a student must maintain registration (at minimum fee, however, irrespective of hours for which enrolled) every semester (no summers, unless desired) until the degree is awarded or the student withdraws his candidacy. For Selective Service and GI Bill purposes, full-time is regarded as 8 hours (assistant's work is counted in this) of courses, or full-time thesis work. For residence credit only, full-time requires 5 hours at 500 or 600 level, or 8 hours of other graduate work, or full-time thesis work. Full load for summer is 3 hours at 500 or 600 level, or 6 hours of other graduate work, or thesis.

Course Requirements

A. Entrance requirements. Applicants for study toward the Ph.D. degree are required to have the same background coursework as applicants for study toward the M.A. degree (see Introduction), except that the undergraduate grade point average is not an essential factor if a Master's degree is already held. Any deficiency in these requirements is to be removed as soon as possible (see Introduction).

B. Subsequent requirements. Five requirements relating to coursework beyond the entrance level must be met before the Ph.D. degree can be granted. 1) At least 46 semester hours of courses beyond the Bachelor's degree numbered 500 or above, including 16 thesis hours, are required. Twenty of the total of 30 non-thesis hours must be in graduate courses taken at this University, and no more than 6 should be accepted in graduate Independent Study without consent of the advisor. By petition after the first full-time semester (or equivalent), a maximum of ten semester hours of graduate course work acquired at some other university may be transferred toward fulfillment of the non-thesis semester-hour requirement. Students may use all 500, 600 and 700 level course work taken at this University to count toward the minimum requirement for the Ph.D. 2) At least four semesters of Divisional seminars, or their equivalent taken elsewhere, must be completed satisfactorily. 3) The specific course requirements imposed by the particular Division and Advisor involved must be fulfilled. 4) At least second-year college proficiency (total 12 semester hours) or equivalent (e.g. native proficiency) in a language other than English must be registered at a C-level or better for the last semester (see the Graduate Catalog for details). 5) Fulfillment of unsatisfied parts of the language and seminar requirements should be started the first year and, unless approved by the Advisory Committee, continued without interruption until complete. Note also the teaching requirement (p. 3).

Advisory Committee

By the end of the first semester, the student is to submit to the Biology office a form ("Graduate Advisory Committee Appointment") which 1) requests permission to work with the Advisor designated, 2) bears agreement by signature of the designated person to act as Advisor, 3) specifies area of thesis research contemplated, and 4) designates two additional members of the Advisory Committee. The functions of this three-man Committee are to aid the student in his research objectives, to ensure against too narrow a specialization, and to assure depth of investigation. It is the responsibility of the Advisor to notify members of the Advisory Committee of their appointment. Any change in membership of the Advisory Committee must be reported by submission of another revised form giving the new membership. Students obtaining their Master's degree under the same Advisor as selected for the Ph.D. degree retain the same Advisory Committee. Changes in personnel can be made only with the consent of all concerned. (See Orientation Advising, p. 4)

When the thesis advisor is a member of some other academic unit of the University, a voting member of the Biology Department must serve as "Co-advisor" for the student. The composition of an advisory committee must be submitted to the Biology Department Graduate Committee (Division Chairmen plus the department Assoc. Chairman, as Chairman of the Committee) for review when first proposed and before becoming official. Composition of Ph.D. Comprehensive & Thesis Committees require similar approval (see pp. 12-14)

Degree Plan

The first duty of the Advisory Committee is to review the student's background and to work out with him a program of academic studies towards the degree. This program should be made out by the Advisor in triplicate on the Degree Plan forms available from the Biology office. One completed copy is submitted to the Department for the Student's departmental file, one is retained by the student, and one by the Advisor. If a student changes his degree plan, a revised plan must be similarly reported. The Advisor and student should keep their copies up-to-date, as running records of academic progress.

Preliminary Examination

In accordance with Graduate School rules, this exam must be written, but may be followed by an oral, at the discretion of the examining committee. The written portion shall consist of two 3 hour sessions, and a copy of the exam shall ultimately be placed in the student's folder in the office.

a. This exam is required of all students who wish to proceed directly to the Ph.D. and bypass the Master's ("superior" grade necessary, see page 8).

b. For students who have received their M.A. at Boulder, a grade of "superior" on the M.A. Comp/Ph.D. Prelim qualifies them to proceed directly for the Ph.D.

c. If a grade lower than "superior" is made by any student in the above two categories, the student must retake the exam passing it at the "superior" level, if he wishes to continue for the Ph.D. The student may retake the examination only once, and must do so during the next semester of regular academic year.

d. Students who received their M.A. prior to coming to Boulder for the Ph.D. will be interviewed and appraised by the Graduate Committee during their first month as Boulder graduate students. The Graduate Committee can request a student to make up any deficiencies which become apparent during this interview, and can require the student to take the Ph.D. preliminary should it be deemed necessary. To conform with Graduate School regulations, minimally a written statement of each student's objectives must be required.

Admission to Candidacy

Formal application for admission to candidacy for the Ph.D. degree cannot be made until 1) completion of at least 4 semesters of full-time residence, and 2) language and seminar requirements are fulfilled; however, formal acceptance of fulfillment of language requirements, by the Graduate School, is not granted until Candidacy is approved. It must be made no later than two weeks before the Ph.D. Comprehensive Examination is to be given. Blank forms may be obtained from the Biology office, and are to be executed in duplicate and returned to that office for formal departmental approval and submission to the Graduate School. Once certified as a candidate, enrollment must be maintained every regular (not summer) semester until the final is passed, at a standard (usually \$70.00) fee, which permits enrollment in any coursework desired, for credit. Registration after the final exam is passed is not required, although the degree is not granted until the thesis is accepted.

Comprehensive Examination

Upon completion of essentially all required formal coursework for the Ph.D. (i.e. excluding thesis and/or Independent Study), a written and oral Comprehensive Exam must be taken. Although only a 9 month interval is required between Comprehensive and Final Examinations, it is to the interest of the student to complete formal coursework and to pass the Comprehensive Examination as quickly as possible. An added inducement is the fact that after Comprehensives are passed only the minimal registration fee is charged irrespective of number of hours for which the student enrolls. It is generally recognized that this examination is the major hurdle of the doctoral degree program, assuming that the dissertation is competently pursued and executed. Its purpose is, however, to test competence in the student's general area of specialization. The Advisory Committee must advise the student, at least 3 months in advance, of the scope, depth, and general nature of the examination. In practice, the Comprehensive Examination covers the area of specialization and peripheral disciplines, and it is organized in any appropriate 4 disciplinary areas (e.g. Reproductive Endocrinology, Histology, Gross Anatomy, Systematic Herpetology, irrespective of existence of formal or informal departmental representation); it does not concern itself with the dissertation itself.

The Comprehensive Examination Committee conducts the examination. The Committee consists of the student's Advisory Committee (3 members) plus any two additional members (either or neither from outside the Department) selected by that Committee in consultation with the student. The written part of the examination is divided into four half-day sessions within a 7-day period and is followed within two weeks by an oral examination. The oral examination is open to all members of the faculty.

For the written section, questions may be given to the student in advance so that he may prepare himself for writing answers during the examination period. In this case the questions shall be rather detailed and require library research, intelligent synthesis of ideas, and considered speculation. Alternatively, questions may be given out only at the examination time, in which case they should be of a more general nature. The type of written exam is to be determined by the student and his committee, and may consist of either type of question, or both. It is understood that regardless of the type of written questions given, the oral portion may legitimately cover any subject within the four designated "areas".

At least a week before the Comprehensive Exam is scheduled to be given, the student or his Advisor is to notify (on the "Ph.D. Comprehensive Examination" form available in the Biology office) the Biology office of the student's name, the date and time of the exam, and the names of the 5 committee members. This information is relayed by the Biology office to the Graduate School, which returns a report form to the Advisor. This must be marked "Satisfactory" or "Unsatisfactory", and signed by all Committee members, at the end of the oral, and returned to the Biology office for relay to the Graduate School.

A successful candidate must receive the affirmative votes of at least three-fifths of the members of the examination board. In case of failure, the examination may be attempted once more, after no less than one full semester.

If a student fails to complete all requirements for the degree within four years of the date on which the Comprehensive Exam was passed, a second Examination by the same Committee, similar in extent to the first, will be required before the candidate may take the final examination. If this second Comprehensive Exam is failed, it may be attempted once more after no less than one full semester. Registration must be maintained every semester (not summer) after the comprehensives are passed, until the final is passed.

Dissertation

This dissertation must be based upon original investigation and must show mature scholarship and critical judgment, as well as familiarity with tools and methods of research. It should be a ~~worth-while~~ contribution to knowledge in the student's special field. The thesis project, plan, and progress should be known to and approved by the entire Advisory Committee from the beginning of the research and throughout its pursuit, so that no major last-minute revisions will be necessary.

The dissertation must be finished and submitted in typewritten form at least 45 days before the date of graduation and must be available for inspection by the examining committee before the final examination may be undertaken.

In mechanical features, all dissertations must comply with specifications obtainable from the Biology office. One formally approved, printed or typewritten copy must be filed in the office of the Dean at least two weeks before the date on which the degree is to be conferred. Two other identical copies must be supplied to the Biology Department, one destined for the student's Advisor.

The student must notify the Graduate School at least 6 weeks before he expects degree conferral of the exact title of his dissertation. The title will appear on the Commencement program.

Directions for submission of the Final Examination Notice should be obtained from the Biology office; similar directions for the Dissertation Abstracts manuscript, and data for the Survey of Earned Doctorates, must be obtained at the Graduate School office several weeks before the Final Examination is taken. The notice must be returned at least 2 weeks before the examination, and the other forms must be submitted with the dissertation to the Graduate School. A \$25.00 fee is payable at that time.

Ph.D. degree students may register for as many semesters as they wish for thesis, but there must be a minimum of 16 hours and no more than 24, with no more than 8 taken in any one semester; enrollment in it must be continuous until the degree is awarded. No more than 8 can be taken before the Comprehensive Exam is passed. Until the thesis is finished the grade is recorded as IP for each semester, and when finished should be graded.

Publication of dissertations is not required but is strongly recommended, in whatever form is most appropriate, in full or in part, as one work or as several. Publication of all or any part of any dissertation prior to award of the pertinent degree (M.A. or Ph.D.) is permissible only by approval in advance of the student's Advisory Committee, furnished by letter, one copy of which must be placed in the student's departmental file, and one in the Graduate School file. If a substantial part of the dissertation has not been accepted for publication within two years after the degree was awarded, the thesis Advisor has the option of using the material for publication under joint authorship.

Seminar

All Ph.D. candidates must present the substance of their dissertations to a Forum, Seminar or Colloquium, after the work has progressed far enough to provide a pattern, and before completion to a point preventing use of appropriate modifications that might be suggested.

Final Examination

After the thesis has been accepted, a final examination on the thesis will be conducted. The thesis must not be in final form at this time; the opportunity must remain for corrections observed by the readers to be inserted. The examination is conducted by a committee of at least five members, including the student's Comprehensive Examination Committee and at least one professor from outside the Biology Dept. The Department requires approval and signatures of three readers (not two as per graduate school requirements). Designation and substitution for readers must be made well in advance of the final and with the approval of all concerned. The readers cannot sign the thesis until the seminar over it has been presented. Changes in personnel can be made only with approval of all concerned. The Advisor notifies the Biology office at least 2 weeks before the examination is to be held of the student's name, the date, time and place for the examination, and the names of the 5 or 6 committee members. This information is relayed to the Graduate School, which sends a Report form, grade card and copies of the Leaflet (see preceding) to the Biology office for distribution. Immediately after the examination the Report is marked "Satisfactory" or "Unsatisfactory", signed by all members of the Committee, and is returned with the completed grade card to the Biology office for relay to the Graduate School.

More than one dissenting vote will disqualify the candidate in the final examination. A student must be registered at the time he takes the final examination. It is advised that no student attempt completion of the degree in the period between the end of the summer session and the following October 1. The final examination must be completed at least three weeks before the intended date of graduation.

TYPICAL SCHEDULE OF DEADLINES OF Ph.D. CANDIDATES
(See Catalog for precise dates in given years)

Entrance Qualifying Examination	First registration in Graduate School
Advisory Committee appointed	As soon as possible, or by the end of the first semester
Preliminary Examination	Without M.A. or with C.U. M.A. degree, by 4th full-time semester after enrollment; with a non-C.U. M.A. degree, by end of 2nd semester (whether full-time or not)
Language Examination and Seminar	During first year and by usually uninterrupted registration thereafter until complete
Application for candidacy filed	By two weeks prior to Comprehensive
Comprehensive Examination - Written - Oral	At least 9 months before Commencement No more than 2 weeks later
Completed thesis available to Committee	At least 7 days prior to Final Examination
Final Examination (Defense of Thesis)	At least 3 weeks prior to Commencement
Thesis filed in Graduate School	At least 2 weeks prior to Commencement
Completion of all degree requirements	Within 3 years after admission with an M.A. degree, 4 years if no M.A. degree sought

THE PH.D. DEGREEGeneral Nature of the Degree

The degree Doctor of Philosophy is the highest academic degree conferred by the University. To state the requirements for the degree in terms of credit hours would be misleading, since the degree is not conferred merely upon the satisfactory completion of a course of study, however faithfully pursued. The student who receives this degree must have demonstrated that he is proficient in some broad subject of learning, and that he can critically evaluate work in this field; furthermore, he must have shown the ability to work independently in his chosen field, and must have made an original contribution of significance to the advancement of knowledge. The technical requirements stated below are minimal requirements for all candidates for the degree.

Required Background

Most graduate students are expected to have completed a Master's degree before becoming a Ph.D. candidate. However, under certain circumstances it is possible for a graduate student to enter directly into the program leading to the Ph.D. degree in zoology or botany, but not in biology, without the Master's degree. Students of high potentiality of achieving success in scientific investigation, and who wish to follow this pathway, should proceed as follows:

1. The student shall successfully complete the Ph.D. Preliminary Examination, with the grade of "Superior."
2. The student shall submit a letter to the Graduate Program Committee from his major advisor, stating the student's ability to do work at the doctorate level and the advisor's consent to being the student's major professor.

The Graduate Program Committee will then approve or disapprove this action and their decision will be reported to both the Faculty and the student. If any staff member objects to the Graduate Program Committee's action, a written statement of this objection should be sent to the Committee within two weeks. The Committee would review the petition once more and make a final recommendation on the petition.

Field of Study

Before the end of the first semester of attendance, a student should select an area in which he intends to specialize. The field of study may be under one department but usually will include work in one or more related departments. The proposed field must represent a unified body of knowledge.

Advisory Committee

As soon as a field of specialization has been chosen, the candidate will request the faculty member with whom he wishes to work to act as chairman of his Advisory Committee. This shall be done before the end of the second semester during which the student has been in the Department. In consultation with the prospective faculty adviser, a form is completed in quadruplicate and submitted to the Graduate Program Committee. The form in essence is, 1) a request for permission to work under the person designated, 2) a compliance, by signature, of the faculty member concerned, 3) a brief statement of the area of research contemplated, 4) suggestions on the part of the student and the adviser as to additional members for the advisory committee and examining committee. A purpose of the

advisory committee, beyond guiding the student throughout his graduate study, is to ensure against too narrow specialization. The Graduate Program Committee upon receipt of this form will take appropriate action and then notify the departmental office which in turn will notify the faculty adviser, the Graduate School and the student concerned. Any change in the membership of the advisory committee is to be similarly reported.

Degree Plan

The Advisory Committee has as one of its first responsibilities the review of the student's background and the working out with him of a program of academic studies towards the degree. This program should be made out by the student in quadruplicate on the degree plan forms available from the Biology office or Graduate School. The completed forms are submitted to the Graduate Program Committee for their approval and thence to the departmental office for distribution to the Graduate School, faculty adviser, student's departmental office file, and the student. If a student changes his degree plan, a revised plan must be similarly reported.

Residence Credit Requirement

The student must be properly registered in order to earn residence credit. The minimum residence requirement shall be six semesters of scholarly work beyond the attainment of an acceptable Bachelor's degree, Mere attendance shall not constitute residence as the word is here used. Residence may be earned for course work completed with distinction, for participation in seminars, for scholarly research performed here or elsewhere under the auspices of the University of Colorado,

As a guiding policy in determining residence credit for employed students, those who are employed in three-fourth to full-time work which does not contribute directly to their program toward a degree may not earn more than one-half residence credit in any semester. Students who are employed more than one-fourth time and less than three-fourths time in work that does not contribute directly to the degree may earn not more than three-fourths residence credit. Those who have one-fourth time employment or less may earn full residence credit. All these provisions are subject to the definition of residence credit given in the preceding paragraph. In case the interpretation of residence credit for any student needs to be clarified, a decision will be made by either the chairman of the student's advisory committee, or the chairman of the student's major department, and the Dean of the Graduate School.

At the end of each semester, or summer session, the student's advisory committee with the approval of the Graduate Program Committee shall report to the Dean the amount of residence credit toward a degree to which the student is entitled. A maximum of 1/3 credit may be received for each five-week summer term. This report is made on a form entitled, "Report on Residence for Ph.D. Candidates" which is available at the Graduate School office. This recommendation shall be based on reports from the student's instructors and other information bearing on the question of continuous intellectual growth and ability to work independently. Thus the criterion of principal importance in measuring a student's progress toward attainment of the Ph.D. degree is residence as here defined, not hours taken in formal courses.

Not fewer than four semesters of residence credit, at least two of which must be consecutive in one academic year, must be earned at this University. The last two semesters of the residence requirement must be earned here, except in unusual circumstances subject to the approval of the Dean.

Nor more than two semesters (three quarters) of residence credit may be allowed for an acceptable Master's degree.

A student must be registered in order to earn residence credit even when activities for that semester require that he be away from the campus.

Course Work Requirement

A minimum of 30 semester hours of courses beyond the Bachelor's degree numbered 500 or above is required for the degree, but the number of hours of formal courses will ordinarily be larger than this. At least 20 of the required hours must be in graduate courses taken at this University. A maximum of ten semester hours acquired at some other university may be used toward fulfillment of the 30 semester hour requirement. Students may use all 500 and 600 level course work taken at this University to count toward the 30 hour minimum requirement for the Ph.D. Students who have been admitted to the Graduate School with deficiencies may expect to receive little or no residence credit until the deficiencies have been removed.

Independent Study Courses

Before a student formally registers for independent study courses he must submit to the Graduate Program Committee a brief statement describing the area of study, which is signed by the person who will supervise the independent study. The area of study should not duplicate or overlap or be a part of research undertaken for a thesis. The area of study should not in essence duplicate courses available to the student. Exception to this may occur when 300 and/or 400 level courses are taken by graduate students as 691 independent study courses with additional work giving them graduate stature.

Independent Study may not be offered to satisfy any part of the minimum requirements for a minor at the graduate level. The maximum number of credits in Independent Study offered as a part of the course requirements for any advanced degree is restricted to six semester hours.

Journal Club

Students are required to take four semesters of Journal Club for which $\frac{1}{2}$ hour credit is given each semester. Several sections of the Journal Club are given each semester. Students must select an appropriate section at the time of registration. Generally, students should select sections concerned with topics outside their area of specialization.

Quality of Work Required

Students are expected to complete with distinction all work in the formal courses in which they enroll. A course mark below B is unsatisfactory and will not be counted toward fulfilling the minimum requirements for the degree. Upon recommendation by the advisory committee and the Graduate Program Committee and with the approval of the Dean, a student may be required to withdraw at any time for a failure to maintain satisfactory progress toward the degree.

Calendar

The Department maintains a schedule of courses for which graduate credit is granted that gives the semesters in which each will be offered in the future. Copies of the most recent edition of this calendar are available in the Department office.

Foreign Language Requirement

Each candidate whose native language is English must be able to read work related to his special field of study in at least two foreign languages. Candidates whose native

language is not English must offer English and at least one language (not his native tongue) in fulfillment of this requirement.

The choice of foreign language is within the discretion of the Department. Proficiency in French, German and Russian is tested by the Graduate School Foreign language examinations published by the Educational Testing Service. Proficiency in other languages will be tested by the appropriate language department. For a candidate whose native language is not English, proficiency in English shall be determined by the Department of Biology.

Residence beyond three semesters may not be earned or accepted by transfer until the language examinations have been passed. This means that at least three semesters of residence must be earned after the second language examination has been passed. A student who passes an examination within six weeks of the beginning of a semester or quarter shall be considered to have passed it as of the beginning of that semester or quarter.

Preliminary Examination

The Department will satisfy itself by written and oral examination that students who signify intent to undertake study for the Ph.D. degree are qualified to do so. At the discretion of the examining committee, the oral part of the examination may be eliminated. This examination should be taken at least two semesters before the student expects to attempt the comprehensive examination and before the end of the fifth semester of graduate work. The preliminary examinations usually are given during those weeks which include the first Monday of December and the second Monday of March. The examination consists of two 3-hour sessions to be given on the morning and afternoon of the same day. The student must notify the departmental office of his intention to take the examination at least four weeks before the examination is scheduled. The comprehensive examination for the Master's degree in this Department is the same as the Ph.D. Preliminary Examination, and students who have a "Superior" rating on the Master's Comprehensive are exempted from the Ph.D. Preliminary.

Written Portion of the Examination

One month before the examination is given the Chairman of the Graduate Program Committee shall appoint a committee of four members from the full-time teaching staff representative of the various kinds of biological disciplines. This committee shall jointly prepare two 3-hour written examinations designed to test the candidate's over-all and integrated knowledge of Biology, utilizing any adequate evidence from any field(s) to illustrate basic biological concepts. The candidate will be expected to demonstrate a depth of understanding developed by reading beyond the normal course work. It is implicit in this statement that different students would bring facts from different fields to bear on questions.

Oral Portion of the Examination (when deemed necessary by examining committee)

All members of the committee shall evaluate each candidate's performance. The committee shall then meet and jointly consider each candidate, with a recommendation for a grade level being determined on the basis of a three-fourths vote of the committee. In the case of a tie vote, the final decision shall be left to the regular, full-time, Biology Department Faculty, with an affirmative vote of three-fourths of the teaching faculty being required for a passing grade. The committee shall prepare a written summary of its findings and circulate it to the faculty members in such a case.

There are three grade levels:

- a) Superior - this permits a student pursuing the Ph.D., with or without the Master's degree, to continue toward the doctorate.
- b) Satisfactory - this does not allow continuance toward the Ph.D. degree, although it is adequate for the achievement of the Master's degree. For a student wishing to continue toward the doctorate and who achieves this level, the Examination Committee may recommend that the student try the examination one more time, after a minimum interval of six months and a maximum of one year. A second performance at this level or below would be reason for dropping the candidate from the doctoral program of the Department.
- c) Unsatisfactory - this is basis for a recommendation by the Committee to: 1) Drop the candidate from the graduate program of the Department. 2) Recommend one further attempt, as in b, with a second performance at the unsatisfactory level being reason for dropping the candidate from the graduate program of the Department automatically.

NOTE: The M.A. comprehensive written and the Ph.D. preliminary written are one and the same examination.

Application for Admission to Candidacy

A student must make formal application for admission to candidacy for the Ph.D. degree on blanks supplied by the office of the Graduate School at least two weeks before the comprehensive examination is attempted. A student must have earned at least four semesters (six quarters) of residence, passed the comprehensive examination, and satisfied his language requirements, before he may be admitted to candidacy for the degree.

Comprehensive Examination

Before admission to candidacy for the Ph.D. degree, the student must pass a comprehensive examination in his field of concentration and related fields. By the student's "field of specialization" or "field of concentration" is meant that major portion of a field of biology such as ecology, physiology, taxonomy, etc., in which the thesis investigation is being carried out. By "other fields" or "related fields" is meant those portions of fields of biology (ecology, physiology, taxonomy, etc.) other than the field of specialization and those portions of disciplines outside of biology (chemistry, geology, mathematics, etc.) which have direct relationship to the thesis problem, principally, and to the student's field of specialization, secondarily. The examination will be given at least six months before a student expects to complete his dissertation and after he has earned at least four semesters of residence, passed his preliminary examination and satisfied his language requirements. The examination in this Department is written and oral. At least 3 months before the date of the comprehensive examination the advisory committee will meet with the student to outline the scope (general content) which will be covered in the comprehensive examination. While the examination is directed toward the field of specialization of the student, it shall also include aspects of other fields which bear on the field of concentration. The student is expected to demonstrate deep understanding of his own field, such depth having been achieved not merely through courses and seminars, but by extensive and intensive reading of the literature of that field. Further, he shall be expected to demonstrate a firm grasp of the ways in which knowledge of his own field is related to other fields.

The examination shall be prepared and conducted by an examining board appointed by the Dean of the Graduate School in consultation with the Chairman of the Department, and

shall consist of the student's advisory committee and additional members as necessary to a minimum of five. The departmental office is notified of the date, time, place and committee members for the written and oral parts of the examination, by the Chairman of the student's advisory committee. The Department in turn notifies the office of the Graduate School of this information in respect to the oral part of the examination only. The Graduate School then prepares a form on which the outcome of the entire examination is recorded.

The written part of the examination shall be divided into four half-day sessions within a 7-day period and shall be followed within two weeks by an oral examination. The oral examination shall be open to all members of the faculty.

A successful candidate must receive the affirmative votes of at least three-fifths of the members of the examination board. In case of failure, the examination may be attempted once more, after not fewer than eight months of further work.

If a student fails to complete all requirements for the degree within four years of the date on which the comprehensive examination was passed, a second examination similar in extent to the first will be required before the candidate may take the final examination. If this second comprehensive examination is failed, it may be attempted once more after not fewer than eight months of further work.

The Department will designate and announce, well in advance, the periods during which all examinations of a given category will be administered to eligible students. A student need not be registered at the time he takes the comprehensive examination.

Final Examination

After the thesis has been accepted, a final examination on the thesis and related topics will be conducted. In the Department of Biology this is an oral examination and is referred to as the "defense of thesis." It is open to any faculty member caring to attend. The examination will be in charge of a committee of at least five appointed by the Dean. Ordinarily the Dean appoints the student's advisory committee, one other member of the Department and at least one other professor representing the University at large. The chairman of this committee will notify the office of the Graduate School two weeks before the examination of date, time, and place of the examination. The student, in consultation with the office of the Graduate School, will submit his vitae and a summary of his thesis at the same time. A form for recording the results of this examination is then prepared by the Graduate School and circulated to the members of the examining committee. More than one dissenting vote will disqualify the candidate in the final examination. A student must be registered at the time he takes the final examination. As a general policy, no students may attempt completion of Ph.D. degrees in the period between the end of the first term of the summer session and the following October 15. The final examination must be completed by two weeks before the intended date of graduation.

Thesis

A thesis based upon original investigation and showing mature scholarship and critical judgment, as well as familiarity with tools and methods of research, must be written upon some subject approved by the student's major department. To be acceptable, this thesis or dissertation should be a worth-while contribution to knowledge in the student's special field. It must be finished and submitted in typewritten form at least 45 days before the date of graduation and must be available for inspection by the examining committee before the final examination may be undertaken.

In mechanical features, all theses must comply with specifications obtainable at the office of the Dean of the Graduate School. One formally approved, printed or typewritten copy of the thesis must be filed in the office of the Dean at least two weeks before the date on which the degree is to be conferred. This Department does not require a copy of the thesis, but a student's thesis adviser may ask the student to provide him with an additional copy of the thesis.

Ph.D. degree students may register for as many semesters as they wish for thesis, but such registrations should be continuous. Until the thesis is finished the grade is recorded as IP for each semester. No credit is given for thesis on the degree plan.

Publication of Thesis

The University of Colorado does not require publication of doctoral dissertations other than publication in microfilm by University Microfilms, Ann Arbor, Michigan. All abstracts of such theses are published in "Dissertation Abstracts," a journal with an international circulation.

Thesis Fee

A fee of \$19.00 will be paid by the candidate to cover microfilming, publishing the abstract, and binding.

TYPICAL SCHEDULE OF DEADLINES OF PH.D. CANDIDATES

Entrance Qualifying Examination	First registration in Graduate School
Advisory Committee appointed	By end of second semester
Degree Plan filed	By end of second semester
Preliminary Examination	2 semesters before graduation (Dec. of year prior to Comprehensive) and before the end of the fifth semester of graduate work
Language Examinations	Same as for Preliminary Examination
Application to Candidacy filed	By Dec. 1 prior to graduation; prior to Comprehensive
Comprehensive Examination	
Written	By Dec. 1 prior to Commencement
Oral	By Dec. 15 prior to Commencement
Completed thesis available to committee	By April 23 prior to Commencement
Final Examination (Defense of Thesis)	By May 15 prior to Commencement
Thesis filed in Graduate School	By 2 weeks prior to Commencement (May 24)
Completion of all degree requirements	Within 4 years after the date of the Comprehensive Examination

UNDERGRADUATE PROGRAMS IN ORGANISMIC BIOLOGY

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Principal Pathways for Majors in Organismic Biology

The following suggested fields of specialization provide flexibility in preparation for advanced study in several fields of biology; they can also serve as effective pre-medical or pre-dental curricula.

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| 1. Morphological biology | 4. Microbial biology |
| 2. Functional biology | 5. Behavioral biology |
| 3. Developmental biology | 6. Systematic biology |

Below are suggested guidelines for election of courses in the listed fields.

A. Selection of courses in the core program.

The Faculty in this Division believe that all biologists should have more than elementary backgrounds in environmental biology and genetics. Therefore students should elect Biol. 351 (Genetics) and one of the field-oriented courses (Biol. 231, 232, or 241).

B. Recommended and/or required courses in other Departments.

These vary somewhat, depending on the field of specialization. Courses listed without qualifying statements are required of all students in the Division.

1. Chemistry. One year of college chemistry, or advanced placement. Organic chemistry is recommended for all, and required of those in physiological, developmental, microbial pathways.
2. Physics. One year of college physics recommended for all, and required of those in physiological, developmental, and microbial pathways.
3. Mathematics. College algebra and trigonometry, or equivalent. Calculus recommended for all, and at least one semester is required of those in physiological, developmental, and microbial pathways. Statistics is strongly recommended.
4. Geology. Those interested in morphology and systematic biology should consider courses in paleontology.
5. Psychology. Those interested in animal behavior, as well as some aspects of physiology should consider election of certain courses in the Department of Psychology. Some of these are cross-listed in biology and will count directly toward the major.
6. Foreign languages. Those who wish to pursue graduate studies in biology should elect a foreign language for which there is a significant research literature, or which will be useful in communication in large portions of

the world. In the former case, French, German, and Russian are especially important.

C. Suggested courses in field of specialization.

Specific selections should reflect pathway chosen and the kinds of organisms which are of special interest to the student. 500-level courses are open to qualified seniors with written permission of the instructor.

1. Morphological biology. Students should elect at least one physiology course (Biol. 321, 322, or 423) and bacteriology (Biol. 301). Others may be selected from the following:

Biol. 212 - Introd. to Entom.	Biol. 413 - Vert. Microanatomy
Biol. 311 - Morph. Nonvasc. Plants	Biol. 414 - Mycology
Biol. 312 - Morph. Vasc. Plants	Biol. 416 - Adv. Comp. Anat.
Biol. 313 - Comp. Vert. Anat.	Biol. 461 - Vert. Embryology
Biol. 411 - Invert. Zool.	

Taxonomy courses (430 series) are especially useful for those interested in evolution.

2. Functional biology. All students should elect one or two morphology courses, selected from the list under C. 1.

- a. Animal Physiology. Required courses are:

Biol. 423 - Cell Physiology (prereq.'s: physics, or, chem., calc.)
 Biol. 422 - Vertebrate Physiology (prereq.: Biol. 423)

Recommended courses:

Biol. 321 - Essen. Plant Physiol.; Biol. 481, 482, - Biochem.,
 Biol. 461 - Vert. Embryol.
 Some 500-level course(s) in physiology, (Endocrinology, Neurophysiology, etc.)
 Biol. 443 - Animal Ecology.

- b. Plant Physiology. Required courses are:

Biol. 321 - Essentials of Plant Physiology
 Biol. 421 - Plant Growth & Development (new course, not yet approved)
 Biol. 423 - Cell Physiology

Recommended courses:

Biol. 241 - Ecology; Biol. 231 - Field Botany; Biol. 312 - Morph. Vasc. Pl.;
 Biol. 481, 482 - Biochemistry; Biol. 441 - Plant Ecology;
 Biol. 430 - Plant Taxonomy.

3. Developmental biology. Emphasis on animal development; currently there is no program in plant development available. Required courses include:

Biol. 313 - Comparative Vertebrate Anatomy
 Biol. 413 - Vertebrate Microanatomy
 Biol. 423 - Cell Physiology
 Biol. 461 - Vertebrate Embryology

Recommended courses are:

Biol. 411 - Invertebrate Zoology
 Biol. 422 - Vertebrate Physiology
 Biol. 546 - Experimental Embryology

4. Microbial biology. Required courses are:

Biol. 301 - Biology of Microorganisms
 Biol. 423 - Cell Physiology
 Biol. 524 - Environmental Microbiology
 Biol. 561 - Microbial Physiology

Recommended courses are:

Biol. 381 - Molecular Genetics; Biol. 311 - Morph. Nonvasc. Plants;
 Biol. 411 - Invertebrate Zoology; Biol. 211 - Parasitology;
 Biol. 436 - Pathogenic Bacteria; Biol. 481, 482 - Biochemistry.

5. Systematic biology. In addition to rather generally useful background courses, the student should elect courses which are primarily botanical or primarily zoological.

General required courses:

Biol. 241 - Princ. Ecol.; Biol. 351 - Genetics

General recommended courses:

Biol. 412 - Quantitative Genetics; Biol. 444 - Biogeography;
 Biol. 451 - Rec. Adv. Pop. Genetics; Biol. 481, 482 - Biochemistry;
 Biol. 573 - Taximetrics; C. S. 201 - Introd. Comp. Sci.; Geog. 400 -
 Climatology; Geol. 102 - Historical Geol.; Geol. 207 - Physical Geol.;
 Psych. 210 - Introd. Res. Meth. in Psych.

Required courses for botany speciality:

Biol. 311 - Morph. Nonvasc. Plants; Biol. 312 - Morph. Vasc. Plants.
 Biol. 430 - Classification of Flowering Plants.

Recommended courses for botany speciality:

Biol. 231 - Field Botany; Biol. 321 - Plant Physiology;
 Biol. 441 - Plant Ecology; Biol. 476 - Palynology; Biol. 571 -
 Plant Biosystematics.

Required courses for zoology speciality:

Either Biol. 313 - Comp. Vert. Anatomy, or Biol. 461 - Vert. Embryol.

AND

Either Biol. 411 - Invert. Zool., or Biol. 212 - Introd. Entomology

Recommended courses for zoology specialty:

Biol. 322 - Essen. Animal Physiol.; Biol. 426 - Animal Societies;
Biol. 431 - Insect Taxonomy; Biol. 432 - Herpetology; Biol. 433 -
Mammalogy; Biol. 434 - Ornithology; Biol. 443 - Animal Ecology;
Biol. 547 - Ichthyology; Geol. 341 - Paleontology; Geol. 447 -
Vert. Paleont.; Geol. 543 - Micropaleontology.

6. Behavioral biology. Required courses:

Biol. 322 - Essentials of Animal Physiology
Biol. 4__ - Introduction to Animal Behavior (new course, not yet approved)
Biol. 441 - Animal Ecology
Biol. 5__ - Topics in Animal Behavior (new course, not yet approved)

Recommended courses:

Biol. 443 - Animal Ecology; Biol. 410 - Behavioral Genetics;
Biol. 425 - Comparative Psychology; Biol. 545 - Comparative
Endocrinology; Psych. 405 - Physiological psychology.

UNDERGRADUATE PROGRAMS IN ORGANISMIC BIOLOGY

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C. Suggested courses in field of specialization.

Specific selections should reflect pathway chosen and the kinds of organisms which are of special interest to the student. 500-level courses are open to qualified seniors with written permission of the instructor.

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Biol. 313 - Comp. Vert. Anat.	Biol. 461 - Vert. Embryology
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Taxonomy courses (430 series) are especially useful for those interested in evolution.

2. Functional biology. All students should elect one or two morphology courses, selected from the list under C. 1.

a. Animal Physiology. Required courses are:

Biol. 423 - Cell Physiology (prereq.'s: physics, or, chem., calc.)
 Biol. 422 - Vertebrate Physiology (prereq.: Biol. 423)

Recommended courses:

Biol. 321 - Essen. Plant Physiol.; Biol. 481, 482, - Biochem.,
 Biol. 461 - Vert. Embryol.
 Some 500-level course(s) in physiology, (Endocrinology, Neurophysiology, etc.)
 Biol. 443 - Animal Ecology.

b. Plant Physiology. Required courses are:

Biol. 321 - Essentials of Plant Physiology
 Biol. 421 - Plant Growth & Development (new course, not yet approved)
 Biol. 423 - Cell Physiology

Recommended courses:

Biol. 241 - Ecology; Biol. 231 - Field Botany; Biol. 312 - Morph. Vasc. Pl.;
 Biol. 481, 482 - Biochemistry; Biol. 441 - Plant Ecology;
 Biol. 430 - Plant Taxonomy.

3. Developmental biology. Emphasis on animal development; currently there is no program in plant development available. Required courses include:

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 Biol. 413 - Vertebrate Microanatomy
 Biol. 423 - Cell Physiology
 Biol. 461 - Vertebrate Embryology

Recommended courses are:

Biol. 411 - Invertebrate Zoology
 Biol. 422 - Vertebrate Physiology
 Biol. 546 - Experimental Embryology

4. Microbial biology. Required courses are:

Biol. 301 - Biology of Microorganisms
 Biol. 423 - Cell Physiology
 Biol. 524 - Environmental Microbiology
 Biol. 561 - Microbial Physiology

Recommended courses are:

Biol. 381 - Molecular Genetics; Biol. 311 - Morph. Nonvasc. Plants;
 Biol. 411 - Invertebrate Zoology; Biol. 211 - Parasitology;
 Biol. 436 - Pathogenic Bacteria; Biol. 481, 482 - Biochemistry.

5. Systematic biology. In addition to rather generally useful background courses, the student should elect courses which are primarily botanical or primarily zoological.

General required courses:

Biol. 241 - Princ. Ecol.; Biol. 351 - Genetics

General recommended courses:

Biol. 412 - Quantitative Genetics; Biol. 444 - Biogeography;
 Biol. 451 - Rec. Adv. Pop. Genetics; Biol. 481, 482 - Biochemistry;
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 Biol. 423 - Cell Physiology

Recommended courses:

Biol. 241 - Ecology; Biol. 231 - Field Botany; Biol. 312 - Morph. Vasc. Pl.;
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 Biol. 461 - Vertebrate Embryology

Recommended courses are:

Biol. 411 - Invertebrate Zoology
 Biol. 422 - Vertebrate Physiology
 Biol. 546 - Experimental Embryology

4. Microbial biology. Required courses are:

Biol. 301 - Biology of Microorganisms
 Biol. 423 - Cell Physiology
 Biol. 524 - Environmental Microbiology
 Biol. 561 - Microbial Physiology

Recommended courses are:

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 Biol. 441 - Plant Ecology; Biol. 476 - Palynology; Biol. 571 -
 Plant Biosystematics.

Required courses for zoology speciality:

Either Biol. 313 - Comp. Vert. Anatomy, or Biol. 461 - Vert. Embryol.

AND

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Recommended courses for zoology specialty:

Biol. 322 - Essen. Animal Physiol.; Biol. 426 - Animal Societies;
Biol. 431 - Insect Taxonomy; Biol. 432 - Herpetology; Biol. 433 -
Mammalogy; Biol. 434 - Ornithology; Biol. 443 - Animal Ecology;
Biol. 547 - Ichthyology; Geol. 341 - Paleontology; Geol. 447 -
Vert. Paleont.; Geol. 543 - Micropaleontology.

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Biol. 4__ - Introduction to Animal Behavior (new course, not yet approved)
Biol. 441 - Animal Ecology
Biol. 5__ - Topics in Animal Behavior (new course, not yet approved)

Recommended courses:

Biol. 443 - Animal Ecology; Biol. 410 - Behavioral Genetics;
Biol. 425 - Comparative Psychology; Biol. 545 - Comparative
Endocrinology; Psych. 405 - Physiological psychology.